THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. IX. Nº 206—12th YEAR.] LONDON, SEPTEMBER 11, 1860. [Subscription per Ann. { 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL was discovered by the Advertiser in 1818. Cannel Coal was then little used in London: after surmounting much opposition, it has become the principal Cannel Coal used in the Metropolis, and has greatly assisted in improving the London gas. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. It is used by all the London Gas Companies, as well as by many Provincial and Foreign. The Crystal Palace was lighted from it in 1851, and the Post-office, Bank, and *Times* Office, are at present.

FIRE-CLAY RETORTS.

FIRE-BRICKS of all descriptions. Manufactory established in 1804.

RAMSAY'S GARESFIELD COAL and COKE.

Bone and Artificial Manures of all kinds.

Address G. H. RAMSAY, Offices, Broad-chare, Newcastle-on-Tyne.

April 27, 1854.

Will be ready in a few days,

REPORT OF

THE METROPOLITAN GAS INQUIRY, 1860.

Reprinted from the JOURNAL OF GAS LIGHTING, &c. Price 7s. 6d. Bound in Cloth.

11, BOLT COURT, FLEET STREET, LONDON.

COUNTY CHAMBERS,
CORNHILL, LONDON, E.C.

MR. R. P. SPICE, of Richmond, respectfully announces that, for greater convenience, he has removed the business of his Office to the above address.

Plans, Specifications, and Estimates, prepared for the Erection or Improvement of Gas-Works.

Agent for the Purchase, Sale, or Leasing of Provincial Gas-Works.

The Green, Richmond, S.W., Jan. 2, 1860.

TO GAS COMPANIES AND GAS-WORKS CONTRACTORS.

IMPROVED MODE OF GAS MAKING,

PATENTED IN GREAT BRITAIN, &c., BY

MR. GEORGE WALCOTT,
24, ABCHURCH LANE, LONDON.

ADVANTAGES:

The whole of the Furnace Fire is used, none being lost by reverse sides of flues or against covering arch of oven, which is not even required. The construction of the Retort is durable with great strength—an arrangement whereby any Carbon encrusting the inside of Retorts is easily removed.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

TO GAS-WORK MANAGERS.

WANTED, in a Month, for a small Town in NORTHAMPTONSHIRE, a man under conditions as above.

St. Neot's, Hunts. GEORGE BOWER.

TO be Sold Cheap, Two Dry-Lime PURIFIERS, one 5 feet by 3, the other 5 feet by 3½, with 4-inch Rack Valves and Connexions; also a VERTICAL CAST-IRON CONDENSER, with eleven 4-inch Pipes, 13 feet long, with bottom box, &c., all in good working condition.

For particulars apply to Mr. FUSSELL, Gas-Works, SLOUGH.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

TO GAS-WORK MANAGERS.

WANTED, in a Month, for a small Town in SURREY, a man under conditions as above; but, the duties being heavier, the wages will be 21s. per week.

St. Neot's, Hunts. GEORGE BOWER.

TO GAS-WORK MANAGERS.

WANTED immediately, a Man to take the Management of Gas-Works erected by the advertiser at Hatfield in Hertfordshire. The whole of the duties will have to be performed by the person appointed; he must, therefore, be able to lay Services, fix and repair Meters, set Retorts, and keep such working accounts as may be desired. Persons applying must do so in their own handwriting, and only send COPIES of Testimonials, as the advertiser does not undertake either to return them, or to answer all letters. It is desirable the person appointed should have previously held a similar situation.

The wages will be 18s. per week, with a good house, coal, and light, free.

St. Neot's, Hunts. GEORGE BOWER.

SIX PER CENT. GUARANTEED.

A FEW Paid-up Preference Shares in an established Gas Company to be disposed of at par.

Direct to BETA, 42, Threadneedle Street, CITY, E.C.

WANTED, A GAS MANAGER.

WANTED, for a small Town in the South of Ireland, an experienced sober Man as GAS-FITTER and MANAGER. He must be capable of keeping Accounts, understand the manufacture of Gas, the fixing of Retorts, and Fitting generally.

Salary £50 per annum (with prospect of increase), and House and Garden at a nominal rent.

Applicant to address in his own handwriting to W. T., Office of the JOURNAL OF GASLIGHTING.

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED 1840.

JOHN EUNSON & SON,

Gas Engineers, and Manufacturers of Clay Retorts

AND FIRE GOODS IN GENERAL,

WOLVERHAMPTON.

Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

THE IMPERIAL IRON TUBE COMPANY,
(SUCCESSORS TO GEORGE B. LLOYD & CO.,)
GAS STREET AND BERKLEY STREET,
BIRMINGHAM,
Manufacturers of Wrought-Iron Tubes and Fittings,
FOR GAS, STEAM, AND WATER.
PATENT GLASS ENAMELLED AND GALVANIZED TUBES,
AND
LAP-WELDED IRON BOILER TUBES.

JOURNAL OF GAS LIGHTING PENNY NEWSPAPER

MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

THOMAS GLOVER,

PATENT DRY GAS-METER MANUFACTURER,

SUFFOLK STREET, CLERKENWELL GREEN, AND
ALLEN STREET, GOSWELL STREET, E.C.

Established 1844.

LORD REDESDALE'S "SALE OF GAS BILL."

LONDON, August 15, 1859.

THOMAS GLOVER takes the earliest opportunity of intimating to Gas Companies and his other Customers that, as Lord Redesdale's "Sale of Gas Bill" has determined the unit of measurement, he is now prepared to supply his Patent Dry Gas-Meters guaranteed to meet all the legal requirements of that bill.

THOMAS GLOVER confines his sole attention to the business of Gas-Meter Making. The propriety of his doing so is satisfactorily proved by his success; and, without the practice of any quackery, or any attempt to delude the public by an absurd exhibition of "Old and New Valves," his Meters are in general use by the Metropolitan Gas and other Companies in this Country and abroad. For example, one Metropolitan Company have now in use above **12,500** of his Patent Dry Gas-Meters; some of these Meters have been fixed for Fourteen Years, and are still in working order, without complaint from either the Company or the Consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

THOMAS GLOVER'S Workshops are now the most extensive in this or any other Country, and he is thereby enabled promptly to execute orders to any extent required. Purchasers may at any time inspect his Works and the Materials of which his Meters are constructed. He is ready to enter into Contracts with Gas Companies and others to uphold their Stock of his Meters for Twenty Years at an annual charge varying from 2½ to 5 per cent., and to leave always in the hands of Gas Companies Three Years' charge for upholding, as a guarantee for the fulfilment of the Contract.

CROSLEY & CO.

ARE PREPARED TO SUPPLY GAS COMPANIES AND OTHERS WITH

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

Similar to that Manufactured by them, and verified by

The ASTRONOMER ROYAL, and Professor MILLER, of Cambridge,

ON BEHALF OF THE GOVERNMENT,

Which was deposited by C. and Co. in the Office of the
COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, in compliance with the

"ACT FOR REGULATING MEASURES USED IN SALES OF GAS."

THEY ALSO SUPPLY

TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

CONTENTS.

	PAGE
Leading Articles:—	
Notes upon Passing Events	601
Circular to Gas Companies	603
Correspondence:—	
The Working Expenses of the Sale of Gas Act	605
Register of New Patents:—	
Lambert, T.—Improvements in Valves and Cocks	606
Bassett, J. A.—Improvements in the Manufacture of Gas	606
Manson, M.—Improvements in Gas-Meters	606
Chadwick, D. and Frost, H.—Improvements in Apparatus for Measuring Liquids	606
Johnson, J. H.—Improvements in Gas-Regulators	607
Walcott, G.—Improved Receptacle for Generating Gas	607
Provisional Protections	607
Notices to Proceed	607
Legal Intelligence:—	
Bristol Police Court.—Conviction for Fraudulently Consuming Gas	607
Miscellaneous News:—	
Meeting of the County and General Gas Consumers Company	608
Meeting of the Liverpool United Gaslight Company	609
Meeting of the Wolverhampton Gas Company	609
Meeting of the United General Gas Company	609
Sale of Gas Act.—Deputation to the Treasury	610
The Gas Question in Bristol	610
New Series of Carbonic Compounds—Quadricarburet of Hydrogen and its Derivatives	613
A Trip to the Coal Oil Region of Pennsylvania	614
Cardiff Gaslight and Coke Company	615
Price Current	615

TO CORRESPONDENTS.

A Constant Reader.—*Consult "Amos, on Fixtures."*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, Sept. 25, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This Journal has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 11, 1860.

NOTES UPON PASSING EVENTS.

One of the most important practical questions of the day is the best means of relieving the streets of our principal towns from the crowded traffic that is poured into them. This question does not affect London alone, but all great towns which have become the centres of Railway Termini. Railways have had the double effect of drawing men and merchandize into and out of towns in numbers and quantities which, under the road and canal system, would have been incredible. The pair-horse stage to the suburbs, and the hackney coach for the streets, the slow canal boat, with a station for embarkation and discharge along all its banks, have been succeeded, if not supplemented, by the centralization of Railway Stations, and the fast, cheap, local transit of cabs and omnibuses. As to passengers, railway season-tickets and omnibuses take every evening to the country or the suburbs multitudes of people who formerly dwelt within a few minutes walk of or over their respective places of business; while long railway journeys bring daily into every great town for pleasure or business, thousands of people who formerly stayed at home to be supplied by village tradesmen or travelling packman, and to be amused by county theatres and assemblies. In the matter of merchandize, the accumulation of weighty, bulky goods, loading heavy waggons and fast vans, is in proportion to the increased facilities of land and sea conveyance, and consequent increase of commerce. The result is, that all day in certain thoroughfares in certain towns, and for part of the day in others, the streets are not wide enough, and the pace possible is not fast enough for the traffic. But the general increase of wealth has increased the value of houses, and made it more costly to widen streets in proportion as it becomes more needed. Still more costly to cut a new street, that being an undertaking for which it is very difficult to obtain a direct return. In London, the value of land varies from something like £50,000 an acre in Bloomsbury to half a million in the neighbourhood of the Bank. In Liverpool, Manchester, and Glasgow, the cost of street improvements is scarcely less formidable, and the demand for quick access, morning and evening, to the open suburbs, if not equally, is very pressing.

London affords the greatest example of loss of money caused by loss of time from the obstruction of streets too narrow and vehicles too numerous. Seventy thousand persons in carriages and 100,000 on foot, cross London Bridge every week day. Of the vans and waggons laden with valuable merchandize, we have no return. But at least twice a day there is a dead lock relieved by a funereal walk extending from the South side of London Bridge by Cheapside to Temple Bar. If we only estimate the number of persons travelling between the London Bridge Station and Temple Bar, or persons interested in goods travelling that distance at 60,000, the time delayed at ten minutes, and the value of each man's day at 10s., we have 5000 days work—something like £75,000 a year on the interest at 5 per cent.—or one million and a half annually lost by the obstruction in the city streets. This is a rude calculation, but we commend an inquiry into this loss of time and money as a fit subject for the calculation of City Statisticians.

Toward relieving this plethora of population and trade, something has been attempted. The projected Railway Stations dotted along the River from Pimlico to Blackfriars, will save a certain number of cabs from all hurrying over to the London Bridge Stations at the same time. But they will also have the effect of creating a new traffic by the increased encouragement they will afford to season-ticket holders. The season-ticket experience of London Railways shows that the holders are chiefly composed of those who can walk from the station to their place of business; where a 6d. cab fare is needed, the number falls seriously, and at 1s. is confined to a few wealthy traders and lawyers. It is, therefore, very doubtful whether the Metropolitan Terminus in Farringdon Street will not add more to than it will take from the crowd of the more crowded part of the Metropolis. If the Underground Railway should prove a success to the shareholders, in spite of the enormous expense of the works, we may perhaps live to see the business streets of the City tunnelled into subways for the use of the carts or trucks of the great wholesale houses during one period of the 24 hours, and at othe times for passengers. At present, the difficulties of loading and unloading goods in the City in the daytime are so great, that one firm, which has the unusual advantage of a court yard out of a crowded street, values this facility for receiving and despatching its merchandize without interruption at upwards of £300 a year. We do not commit ourselves to subways for goods traffic at a cost of from £100,000 to £300,000 a mile; but if they are made to any extent, it must be in streets where the owners of warehouses will pay heavy rents for vaults, and heavy tolls for the use of the tramways. For the majority of passengers an underground railway in the districts of crowded streets would be useless, because each passenger wants to descend at a different part of each street. They will only be useful to the through traffic from distant points, and valuable as links of existing railways. The completion of the new street between Southwark and Westminster will be a capital improvement.

The Metropolitan Board state in their report that "they hope to be in possession of all the ground by the middle of 1861;" another year will, we trust, see it finished and open for use. In the meantime, the expenses incurred for opening up the space between Sloane Street and the New Battersea Bridge appears likely to be so much money lost, for the road will be little used when the railway station is transferred to the new Pimlico terminus.

The embankment of the north side of the Thames will be a proper accompaniment to the Westminster and Southwark Roads; and if the scheme for a tramway, described in our "Notes" of August, be adopted, it will make a main trunk line in the now much-discussed system of "Street Railways."

Street Railways have been recently brought prominently before the public by the opening of a short length, part of an extended system about to be carried out at Birkenhead; the Surrey side of Liverpool. This commencement is due to the enterprise and energy of an American gentleman—a Mr. Train—and is likely to be received less favourably and investigated less seriously than it deserves—in consequence of the excessive amount of direct and indirect advertising bestowed upon it. The Barnumizing, which is the regular accompaniment of every new project in the United States, is very apt to create repulsion and disgust in this older, calmer country where long rhetorical speeches, and thick half-digested wordy pamphlets are alike considered "bad taste" and a bore. Nevertheless from Mr. Train's undigested advertising pamphlet there is some useful information to be gleaned. Street Railways are in extensive use, and have proved a profitable investment in America. Six different Street Railroad Companies in New York in the year 1858 carried altogether upwards of 34,000,000 passengers, on an aggregate length of 45 miles. All these companies paid dividends of from 6 to 12 per cent., the fares being about 2½d. a head. In Philadelphia, with 600,000 inhabitants, there are nearly 100 miles of Street Railways. Boston, with a population of 200,000, has 50 miles; and several extensions are in progress. In other towns of the United States and Canada the system has been, or is, in progress of adoption. The dividends of two companies in Boston exceed 8 per cent. The traffic of English provincial towns will scarcely exceed that of the American cities named, and even in London there are main lines of thoroughfare where the great width makes a re-arrangement of carriage traffic not difficult. Of course, it is out of the question to carry a Street Railway through or beyond Temple Bar on one side, or Moorgate Street on the other. Tramways have been so long in use in our Mineral districts, that it is unnecessary to say anything on the saving of horse power effected by their use. A pair-horse omnibus on a railway would carry sixty passengers instead of twenty, with more space and comfort for the sixty than for the twenty. Thus each railway car would displace two, if not three, ordinary omnibuses, and as many pair of horses. The rails used "are so contrived as not to interfere with the ordinary traffic of the streets they traverse; but, on the contrary, afford a surface which is invariably taken advantage of by drivers going in the direction of the tramways"—the only regulation for the use of the rail being, that all vehicles shall make way for the railway omnibuses. In America, the Street Railway Companies are bound to keep the roadway in repair for from two to four feet from the centre of the tramway. The gauge varies from the ordinary railway gauge to five feet six inches. A break contrivance enables the conductor to stop the railway omnibus quite as quickly, if not more quickly, than an ordinary street omnibus. The rails are laid on longitudinal sleepers, and can, it is stated, be diverted easily for the repairs of Gas or Water Companies' mains. In one American town there are street omnibuses drawn by a single horse or mule—a plan worth consideration for communication between country towns and railway stations. The expense is estimated at £3000 a mile. It ought to be less in England than in America, as iron is cheaper and labour more easily to be obtained.

The routes that have been recommended for London are—1. From Regent Circus, along Piccadilly, to Hammersmith and Kew; 2. Oxford Street to Notting Hill; 3. Bayswater, by the Marylebone and New Road, to Moorgate Street; 4. Bricklayers Arms to Greenwich; 5. Westminster Bridge to Clapham; 6. Whitechapel to Stratford-le-Bow; 7. London to Blackwall; 8. Westminster to London Bridge, by the Borough and New Southwark Road, with a branch over Waterloo Bridge to the Strand. It is obvious that some of these routes have not sufficient traffic to pay for the speculation—as, for instance, the Greenwich Road, which with difficulty supports a few crazy omnibuses. There are other lines where very serious ascents intervene—as, for instance, between Kings Cross and Islington; but such obstacles the Americans overcame by extra horses stopping at the foot of the hills.

It is not worth while to consider the mechanical objections raised by the ex-parish orator, Sir Benjamin Hall—as, for instance, that the tramway might tear off coach-wheels; because such an accident had once happened to his own carriage on a rude Welsh mineral tramroad. Our mechanics are equal to supplying a safe arrangement, if it be decided that a Street Tramroad is desirable. The objection on the ground that the street traffic is too great for the adoption of the American plan, must be considered in reference to each street and each town. For instance, from Paddington to Moorgate Street, although there are one or two narrow streets, there is nothing dangerous in the passenger or carriage traffic. Mr. Newlands, the official engineer of the borough of Liverpool, standing high in the profession, with experience in heavy street traffic and the Liverpool Dock Tramways, after having examined the whole question, reported to the Council that the introduction of Horse Railroads into the cities of the United States had "systematized traffic, and rendered commodious streets that were previously crowded and almost impassable by the irregularity of the driving." And, speaking of Liverpool, he says: "So far as the traffic is concerned, I see no difficulty in the way of introducing Horse Railroads; their advantages have been proved to be great, and the evils attending them few, even under *systems of monopoly and mismanagement*—the evils belong simply to malconstruction, and may easily be avoided." . . . . . "I believe it is proposed that the carriages (for Liverpool) should not exceed six feet in width over all, and that only a single line be laid. The track would necessarily occupy the centre of the street or road, and would be used by the loaded omnibuses, leaving the wings on each side for ordinary traffic. If the rails were laid as above suggested, one wheel of a vehicle on the wings might work in the track; and it is easy to see that there is in this arrangement the rudiments of a systematic regulation of traffic in the great thoroughfares."

With respect to the metropolis, perhaps, after the concentration on certain open points (by the use of Street Railways) of the traffic which daily flows towards the City, funds might be found from the rent of the privilege for widening narrow lanes, or even cutting a short new street. The trustees or parishes interested in the roads, will naturally hesitate at giving up part of the road to a private company; for the traffic of our great towns grows so rapidly, that the demand for conveyance might, in a very few years, overtake the supply; and we learn that the omnibus companies in Paris find it advantageous rather to disappoint a great number of customers than incur the risk of running empty omnibuses. For this reason, in London, with open competition, it is much easier to get a place in an omnibus than in Paris, where you may wait for an hour, and see several doctors precede you; the necessity of waiting for a place in an omnibus being so well accepted as inevitable, that medical men have the special privilege of the first vacant place. Perhaps the better plan would be to concede the right to make Street Railways to private companies for a limited term, under one general Act for each town, because private companies have much more energy than municipalities. At the end of the term, the parish or municipality might let out what omnibus people call its "Times" to several individuals or companies. Thus the districts traversed would obtain annually increasing rents towards the repair of the roads, and have the advantage of vigorous public enterprise without the risk of an omnibus speculation. It would be economical to have for each town one general Act of Parliament, like the Tithe Commutation Enclosure or Drainage Acts, and one general plan sketched out with a view to centres of collection, distribution, and future extensions. At Birkenhead, we observe Mr. Train proposes that, "if properly supported by the corporations, the ladies, instead of being packed in a sardine-box with a sweep, as in the present omnibus system, shall step under cover in any part of Birkenhead into a commodious railway carriage—ride to the pier—walk under a glass arcade into the saloon of the new ferry boat—walk, again, under a glass arcade from the floating stage to the railway carriage on the Liverpool side, and be taken to St. George's Hall or the Philharmonic." A very tempting promise!

The proposition for this essential change in our street arrangements is now at a stage in which it is certain to be fully discussed. Omnibus travellers or road ratepayers must not be frightened from giving the bargain offered by any company that may be formed for the purpose fair consideration by the idle cry of Monopoly. The question they have to consider is, whether a limited and guarded monopoly like that bestowed on the Post Office, on railways, on district gas and water companies, is or is not for the advantage of the public. If a monopoly be established with the principal view of paying high dividends to favoured shareholders, then it is an injury to the public. But if certain privileges are granted to a conveyance company in consideration of their investing a considerable capital in endeavouring to save the public time and money in fares and

taxes, then a monopoly may be an excellent arrangement, as excellent as superseding Roderick Random's road waggon, or the fast four-horse "Taglioni," by Stephenson's locomotive-*drawn* carriages and trucks.

The Report of the Metropolitan Board of Works, for the year ending 10th August, 1860 has just been issued, and is not by any means a satisfactory document. The style is obscure, and the information meagre. The style may be excused because it is most likely that the draughtsman had the usual difficulties which fall to the lot of the man who prepares a report for a board or council. Every member of the Cabinet, every director of the company, as the case may be, suggests an alteration, and the final result is a document at once bald, disjointed and obscure. Each year's report of the Metropolitan Board ought to be complete in itself. It ought to recapitulate enough to inform the ratepayers of what has been done on each work from the commencement, and what is going to be done. A very few additional lines of printing would do this. And in printing, whether as regards paper or type, the Board is royally magnificent, but in the way of information for the use of taxpayers who have not followed the debates and reports from the beginning, it is wonderfully costive; in that respect following the bad example of many ancient and wealthy incorporations.

The Northern High Level Sewer, extending from the Mansfield Road near the foot of Hampstead Hill, to a point on the river Lea near Old Ford, being with branches about eight miles in length, is nearly completed. When finished, it will intercept all the waters descending from Highgate and Hampstead, and relieve Hackney from the nuisance of the foul Hackney Brook, a stream that has by time been converted into an open sewer. The High Level Sewer south of the Thames, extending from High Street, Clapham, to Deptford Creek, traversing Stockwell, Camberwell, Peckham, and New Cross, a length of more than 9 miles, was commenced 26th of December, 1859. The above named district will benefit enormously by this work, getting rid of several foul brooks, and obtaining in the low situations for the first time, the means of efficient drainage. The Board reports that the course of the Low Level Sewer North of the Thames must depend on the decision of Parliament as to the Embankment of the Thames. This may now be considered a question which will be settled next session. We shall take an early opportunity of returning to the evidence given before the Embankment Committee.

Mr. Hawksley has been employed by the Board to prepare plans and specifications for the Steam Pumping Apparatus to be erected at Deptford Creek, and used for lifting the sewerage into the outfall sewer, in accordance with the report of the late Mr. Robert Stephenson, Messrs. Field, Penn, Bidder, and Hawksley. The Board went to the best authorities in pumping machinery.

A very important work has been decided on and commenced by the Board, which will go far towards bringing the Serpentine into a cleanly condition without any extravagant expense, viz.—a sewer from that near Albert Gate across Hyde Park and Kensington Gardens to join the Ranelagh main sewer in the Uxbridge Road. When this is finished, no more sewerage will at any time flow into the Serpentine, and the measures already adopted will soon bring it into the condition of a lucid lake. Only Sanitary Quacks believe that mud covered with ten feet of flowing water can have any injurious effect on the atmosphere.

The weather has this year relieved the Board from the difficult task of attempting to deodorize the Thames. It is to be hoped that before the year 1863, or the summer of 1864, a north Thames Embankment and a low-level sewer will render the use of either lime or perchloride of iron needless. We are not surprised to find that the Board have *not* found, in answer to their repeated advertisements, any parties able and willing to utilize the sewerage of the metropolis. Mr. Alderman Mechi, who does *not* use sewerage, and who has never relied on liquid manure for his crops, contents himself with writing letters very like the effusions of the proprietors of patent universal medicines, and his disciples say ditto to the Alderman, without venturing their money on a speculation that may at some future time succeed, but which has hitherto invariably failed to grow profitable crops. The Board say that they hope to be in possession of all the land for the Southwark and Westminster communication in the middle of the year, but do not state when the street will be finished, or what sort of a street it will be when finished. No doubt they have said this once, but recapitulation would do no harm. As to the Covent Garden Approach, they supply the least possible information, but mention that they have, as an experiment, contracted for a "Subway under this new street, 7 feet 6 inches in height by 12 feet in width, with 14 arched passages for house service-pipes, together with proper cellarage on either side of the street." This very costly work was well worth trying; as before observed, Subways will be most likely to pay where building land is most valuable. When a street length has been made, future extensions must depend on the willingness of houseowners on each side to pay for the convenience.

Circular to Gas Companies.

A REVIEW of the Acts passed during the last session for regulating the supply of gas shows that Parliament granted additional powers to six incorporated companies, that statutory powers have been granted to four existing companies which did not previously enjoy them, and that three other Acts were passed for regulation and transferrence of management, but none for the establishment of a competing company. At the commencement of the session, there were eighteen applications to Parliament, but, as we predicted, five of them, including the two projected consumers companies for Marylebone, and the Brighton, Richmond, and Oxford speculative bills, were withdrawn by the parties promoting them. Only a few of the Acts that were passed met with opposition, and the general tendency of legislation in those cases was favourable to gas interests.

Commencing with Abergavenny: the Improvement Commissioners of that town attempted to obtain powers to enable them to compete in the supply of gas with the established proprietor of the gas-works, with whom they had entered into contracts to light the town for one thousand years. They endeavoured to prove that he had failed to perform his part of the contract by not giving an adequate supply, and that the gas was of bad quality. Mr. Samuel Hughes, the principal witness called to establish those points, with more than his usual recklessness of statement, told the committee, that in a town with about 5000 inhabitants, the coke and tar return was 80 per cent. of the sum expended in coal for the manufacture of gas, that acetate of lead will not detect 1 per cent. of sulphuretted hydrogen, and that the bromine test of illuminating power of coal gas is capable of ready application. The services of this speculative philosopher were of little avail to the Improvement Commissioners in their designs against the proprietor of the existing works. The Act, as passed, gives the commissioners power to enter into contracts for lighting the district, and to purchase by agreement any gas-works now established, or which may hereafter be established by the authority of Parliament, and to manufacture gas and light the town; but it is specially provided that they shall not erect any works, and that nothing contained in the Act shall prejudice the contract entered into with the predecessor of the present proprietor in 1823. The *maximum* price of gas, when supplied by the commissioners, is not to exceed 5s. per 1000 feet for 12 sperm candle gas. Provision is made for testing the illuminating power, on the requisition of not less than five consumers to any two justices, who are authorized thereupon to appoint a competent person to make the requisite experiments at the works, after giving six hours notice. Nothing is said in the Act about the purity of the gas. The Gas-Works Clauses Act is incorporated, with the exception of the sections relating to the amount of profit.

The application of the Dover Gas Company to Parliament for further powers gave rise to a storm of opposition. The Local Board of Health consented to be made the cat's paw for the embryo consumers company in opposing the bill, and no less than thirty-four amendments and additional clauses were proposed for the purpose of defeating its object. The propositions in those amendments were taken, almost *verbatim*, from the Metropolis Gas Regulation Bill as concocted by Messrs. Hughes and Beal, and the rejection of the whole of them by the committee was a warning to those gentlemen of the defeat they were to experience when their time arrived. By the 1st and 2nd clauses of the Dover Gas-Works Act, 1860, the former Act is repealed, and the company are re-incorporated. The capital is stated to be £21,945, one half of which was the original capital of the old company, and the other half consists of money applicable to dividends. In the new division of the capital, it is to consist of 2090 five-guinea shares, to be called A shares, and an equal number of the same amount to be called

B shares. Ten of each class of shares are to be given to the holders of every £52. 10s. share in the dissolved company, thus doubling the nominal value of their shares. Power is also given for the creation of new £5 shares to the amount of £18,445, and to borrow on mortgage £10,000. The owners of the B shares are not to receive more than 5 per cent. from the profits of the undertaking, and the dividends on the new shares are limited to £7. 10s. The number of the Directors of the company is not to be less than three, nor more than five; the qualification for a director being £200 paid-up capital. Each holder of a £5 share is entitled to one vote, with an additional vote for every £25, above £50 up to £500; and above that amount it requires £50 paid-up capital to confer an additional vote. The illuminating power of the gas is to be 12 sperm candles, unless prevented by frost or unavoidable cause or accident, and it is to be "as free as possible from sulphuretted hydrogen, or other compounds, deteriorating its purity." The company are to provide testing apparatus, and a temporary inspector, to be appointed by the Local Board, may, on giving three hours notice, enter the company's premises to test the illuminating power of the gas. The *maximum* price is limited to 5s. 3d. per 1000 feet. Consumers may provide their own meters, or rent them from the company at the following rates:—for two and 3-light meters, 5s.; for a 5-light meter, 7s.; for 20 lights, 9s.; and for a 60-light meter, 22s. The company are bound to supply gas within 30 feet of their mains.

The Leicester Gas Act, 1860, is similar in its general provisions to the Dover Act. The preamble recites, at great length, the powers conferred by previous Acts to raise capital, in addition to which a sum of £21,000 has been raised out of the profits of the undertaking. The first clause repeals the previous Acts, and in the re-establishment of the new company, the Companies Clauses Consolidation Act, the Land Clauses Consolidation Act, and the Gas-Works Clauses Act are incorporated with it. The capital stock of the new company is stated to be £50,700, and the directors are authorized to create additional shares, not exceeding in amount £69,300, and to borrow £10,000. The newly-created shares may be made preference shares, with dividends limited to 6 per cent.; and the dividends on these shares created without preference are to be limited to £7. 10s. Every £10 share of the dissolved company is increased to £13, and on those original shares the dividends are only limited by the Gas-Works Clauses Act. They are also to have the advantage of receiving, by way of bonus, 3s. per share out of the first profits of the company, after payment of the dividends on the preference shares. The number of directors may be nine, but not less than six; the qualification being £500 of paid up capital. The *maximum* price for 12 sperm-candle gas is fixed at 4s. 6d. Provision is made for testing the illuminating power of the gas, but there is no mention of its purity. The company are prevented from erecting any works for the manufacture of gas beyond the lands they now occupy.

The Blackburn Gas Act very briefly states that the capital of the company, consisting of £90,000, is inadequate to enable them to supply the district, and it authorizes them to double it by the creation of new shares of £15 each. The company are further empowered, after the whole of the additional £90,000 has been raised by shares, to borrow £20,000. The dividends on the new shares are not to exceed £7. 10s. per cent. The *maximum* price of gas is fixed at 5s., without any mention of illuminating power, or purity, or means of testing.

The Croydon Commercial Gas and Coke Company are empowered by the Act obtained this session to double their present share capital of £20,000 by the creation of shares of £5 each; also to increase their borrowing powers from £6,000, the present sum, to one-fourth part of the additional capital. The dividends payable on the new shares are limited to 7½ per cent., unless a larger dividend be necessary to make up the deficiency of former years. The *maximum* price for twelve sperm-candle gas is to be 6s. The Act gives power to "the local board, or *any consumers of gas of the company, not being less than five*," to appoint a competent person to test the illuminating power of the gas on the company's premises on giving three hours notice. There is no standard of purity specified.

Of the four incorporation bills, the one for incorporating the gas company at Torquay was the only one opposed. The opposition proceeded from the Local Board of Health, who required that the works should be removed from their present site, that the price of gas should be reduced, and the standard of illuminating power be raised. The first point was conceded by the company, as they desired to have a more convenient place for their works, and the other points were given in their favour. In the incorporation of the company, the Gas-Works Clauses Act, the Land Clauses Consolidation Act, and the Companies Clauses Consolidation Act are embodied. The share capital of the company is fixed at £25,000, divided into shares of £10 each, with power to borrow £6000. The rate of dividend on £21,800 of the capital is to be 10 per cent. and on the remaining £3,200, which accumulated out of profits, the rate of dividend is to be 5 per cent. Power is given to take specified land for the new company's works, and the existing works are to be discontinued within three years. The consumption of gas in the public lamps is to be measured by meters placed at one lamp in every twelve, and the consumers meters, when supplied by the company, are to be charged the same rents as those stated in the Dover Company's Act. The *maximum* price of gas is not to exceed 5s. 6d. per 1000 feet; the illuminating power is to be equal to ten sperm candles, when not prevented by frost, or unavoidable cause or accident, and the gas is to be "as free as possible from sulphuretted hydrogen, and other compounds deteriorating its purity."

The three other incorporating Acts, comprising the Droylsden, Mirfield, and Widnes companies, present no distinguishing features from similar Acts passed for that purpose. The share capital of the Droylsden company is to be £25,000, with power to borrow £6,250. The *maximum* price for the first five years is to be 6s., which is to be afterwards reduced to 5s. 6d. for 10 sperm-candle gas. The Mirfield Gas Company are to have a capital of £35,000, divided into £5 shares, with power to borrow £8000. The *maximum* price is fixed at 5s., and the illuminating power at 11 sperm candles. By a special clause of this Act, the Directors are empowered at any time to suspend their secretary. The Widnes Gas and Water Act fixes the share capital at £40,000, to be divided into shares of £5 each, and power is given to borrow £10,000. The illuminating power is to be 12 sperm candles, and the *maximum* price of gas 6s. 8d.

The last of the Acts passed during the last session is the one for regulating the gas supply of the metropolis, which received the Royal Assent on the day that Parliament was prorogued. The important provisions of that Act have been so often discussed during its various stages of progress that it is unnecessary to give an abstract of them on this occasion. The sanction of Parliament to the districting arrangements, and the measures adopted for regulating the virtual monopoly it produces, though specially applicable to the metropolis, and in a great degree exceptional, may nevertheless serve as precedents in future legislation of gas affairs in large provincial towns.

The Macclesfield Gas Act and the Scarborough Gas Act, which give further powers to established companies, and the Highbridge Markets and Gas Act, have not yet been printed; therefore we are unable to include them in this summary of the Acts of the last Session of Parliament.

In recapitulating the proceedings in the last session bearing on gas interests, we should not omit to notice Mr. Craufurd's failure to alter the law with respect to the breaking up of highways and roads for laying gas and water pipes, and Mr. Sheridan's failure to amend Lord Redesdale's Sale of Gas Act. Mr. Craufurd had an opportunity, as chairman of the last general meeting of the County and General Gas Company, of explaining his reasons for the introduction of his measure, and his intentions with respect to its revival in a future session, but no allusion was made to the subject. The gas-meter manufacturers have sent a deputation to the officials at the Treasury urging them to suspend all steps towards carrying out Lord Redesdale's Act till the amendments to be made in it have been decided upon, and suggesting the necessity for the appointment of a committee of practical men to prepare the heads of an amending bill.

Next session Sir John Shelley promises to introduce a bill for remodelling the Gas-Works Clauses Act, 1847, which Act Messrs. Beal and Hughes have declared to be "old and obsolete." The objects of a bill from such a quarter may be easily guessed at, and such a measure must be carefully watched. The Parochial Assessment Act is also to be revised, and if any equitable mode for the assessment of gas and water-works can be devised, an opportunity will then be presented for its consideration.

The Blue-Book of the Minutes of Evidence given on the Metropolis Bill contains a series of important returns handed in by the thirteen Metropolitan Companies, setting forth the capital employed by each company, the sums paid in dividends and interest, and the additions made to the reserve-funds out of profits during the last five years. In the following table the returns for 1859 are grouped together in such a manner as to show these details at one glance, and in a separate column we have added the per centage which these profits bear to the total capital employed by each company in carrying on its undertaking. From this it appears that the aggregate capital of the thirteen gas companies amounts to £5,193,416, and the aggregate profits to 6·91 per cent; the highest being at the rate of 9·28 per cent., and the lowest 4·88 per cent.

	Capital.		Dividends and Interest.		Per Cent.
Chartered Gas Co.—	£	£	£	£	
Share capital paid up	...	652,500	...	52,200	8·
City of London Gas Co.—					
Share capital paid up	300,000	324,255	18,000	24,243	7·47
Borrowed capital	24,255		1,243		
Addition to reserve-fund	...	...	5,000		
Commercial Gas Co.—					
Share capital paid up	273,210	320,210	15,604	18,209	5·68
Debenture debt	14,600		584		
Borrowed capital	32,400		1,575		
Addition to reserve-fund	...	...	446		
Equitable Gas Co.—					
Share capital paid up	200,000	269,750	12,000	15,372	5·69
Debenture debt	69,750		3,372		
Great Central Gas Co.—					
Share capital paid up	172,160	251,260	8,608	15,915	6·33
Debenture debt	66,000		3,300		
Borrowed capital	13,100		407		
Addition to reserve-fund	...	...	3,600		
Imperial Gas Co.—					
Share capital paid up	934,705	1,422,108	80,535	100,732	7·09
Debenture debt	149,000		7,197		
Capitalized profits	338,403		13,000		
Independent Gas Co.—					
Share capital paid up	120,000	150,000	10,500	11,802	7·86
Debenture debt	30,000		1,302		
London Gas Co.—					
Share capital paid up	550,228	653,508	25,385	31,940	4·88
Debenture debt	82,280		4,013		
Borrowed capital	21,000		950		
Addition to reserve-fund	...	...	1,692		
Phœnix Gas Co.—					
Share capital paid up	...	468,000	38,644	38,709	8·27
Addition to reserve-fund	...	...	65		
Ratcliff Gas Co.—					
Share capital paid up	80,000	106,787	4,000	5,339	5·*
Borrowed capital	26,787		1,339		
South Metropolitan Gas Co.—					
Share capital paid up	...	152,000	13,920	14,118	9·28
Addition to reserve-fund	...	...	198		
Surrey Consumers Gas Co.—					
Share capital paid up	132,538	173,038	10,218	12,090	6·98
Debenture debt	34,500		1,688		
Borrowed capital	6,000		184		
Western Gas Co. (Lim.)—					
Share capital paid up	205,000	250,000	14,000	18,319	7·32
Debenture debt	39,000		1,874		
Borrowed capital	6,000		300		
Addition to reserve-fund	...	...	2,145		
		5,193,416		358,988	6·91

The Ediles of the good city of Bristol have settled their differences with the gas company in true "penny wise and pound foolish" fashion. They have declined the company's offer to supply 5-feet burners with gas at 3s. 3d. per 1000 cubic feet, preferring to pay 3s. 9d. per 1000 feet for 4-feet burners. By this arrangement, they save about 9 per cent. upon the sum they would have expended annually in gas, had the company's offer been accepted, and they reduce by upwards of 30 per cent. the quantity of light hitherto given by the street lamps, for although a 5-feet batswing burner may give a light of 12 candles power, one of 4 feet will not give much more than 8 candles with gas of the same quality. The effect upon the public conveniece of thus reducing the quantity of light in the tortuous streets of the ancient city may be safely foretold, and it is not unlikely that an attempt may be made to throw the odium on the gas company. The neighbouring city of Bath will be referred to as an example of the satisfactory lighting of a town by similar burners, forgetting, perhaps, that the average distance of the lamps from each other is there only 45 yards, while in Bristol it is 70 yards, and that to place the two cities on the same footing in respect to their public lighting, Bristol should increase the number of its lamps 50 per cent., if they are to be reduced to 4 feet-burners. These facts ought to be seriously considered by the Bristol local board before they venture on the experiment, for every step taken by them in the recent negotiations has tended to place them more and more in the wrong. They were parties to the insertion of the clause in the company's Act whereby the latter are bound to furnish a supply of gas to the street lamps at the lowest price charged to any private consumer—an obligation which they have at all times been ready to fulfil, and in offering a reduction of 13¼ per cent. upon that price, the company gave a substantial proof of their desire to deal liberally with the public authorities. Such a concession ought to have been satisfactory; but it appears as if it had been thought that capital might be made by calling for a still greater reduction, and step by step the question has reached its present complicated stage. The company have taken their stand, and have declined to listen to the seductive offers of the local authorities to purchase their goodwill by the sacrifice of the interests of their other customers. The temperate and unanswerable statement issued by them, and reprinted *in extenso* in our last issue, might have been made stronger still had the company been more fully acquainted with the details of the operation of the system of undercharging the public lights in some other of the towns referred to in the report of the committee of the local board. In Dover, for instance, they are supplied under an old contract—a portion at 2s. 6d., and the rest at 1s. 10d. per 1000 cubic feet. The result is a positive loss to the company of £420 a year, which is equivalent to nearly 6d. per 1000 feet on the entire private consumption. In Halifax and Carlisle, the gas-works have been purchased by the ratepayers, and it is therefore not to be wondered at if they should charge themselves respectively 1s. 5¾d. and 2s. 0¾d. for 1000 feet while the private consumer pays up to 4s. and 4s. 2d. Indeed, in all the instances brought forward by the local board in support of their views, special circumstances might be mentioned which render this sort of evidence utterly worthless, and this appears to be now the opinion of the board itself, if we are to judge from the tone of their proceedings on Saturday last. Abandoning their position that they are entitled to a supply of gas at less than the lowest price charged to any private consumer, the board sets up their inspectors' reports as proof that the quantity supplied is less than is contracted for, and that 4-feet burners will light the city as effectually as it is lighted under the present contract. Mr. Hughes made somewhat similar assertions with respect to the public lighting of the metropolis; and at pages 108, 109, 110, and 111 of the minutes of evidence will be found elaborate calculations, intended to prove that by this system of short supply the thirty-nine parishes and districts forming the metropolis were defrauded to the extent of £50,638 per annum! No one, however, ever ventured to suggest the expediency of taking his figures as the basis of a contract. It has been reserved to the Bristol Local Board of Health to make such a hazardous experiment, and we can only hope they will gain experience by the operation.

* The addition made to the reserve-fund is omitted in this return.

Correspondence.

THE WORKING EXPENSES OF THE SALE OF GAS ACT.

SIR—As a gas engineer, and one who has been consulted upon the Sale of Gas Act (22 and 23 Vict., cap. 66), at various stages of its formation, I venture to direct your attention to the seventh clause of that Act, as to the means of defraying the expenses incurred by the inspectors, and in purchasing copies of the standard.

It is enacted that such expenses shall be defrayed by the funds raised from the general district lighting-rates in the respective counties, cities, towns, or boroughs.

Upon reflection, this will appear to all a very great evil, and one requiring amendment before other parts are revised, as the welfare of the clause in reference will alone affect the future prosperity of the Act.

The evil I refer to is, that *both* the consumer and the *non-consumer* of gas will be equally compelled to defray the debts of the

Act, although the one may not have the slightest interest in it, inasmuch as he neither burns gas, nor receives any direct benefit from it; so, for instance, A is a consumer and B is *not*, yet B must contribute towards the expenses of A in availing himself of the benefit of the Act, which, as you must confess, is a most unfair method of taxation, and reminds one forcibly of "killing the *wrong* man."

I would not trespass upon your space did I not think that the clause demands better legislation, and that during the coming recess of the House opportunity will be afforded for proposing some other method of raising money to carry the Act into effect. In the meantime, I beg to enclose my views, which are deemed very feasible, simple, and likely to overcome the objections to that clause in the Act.

First, I should propose—

1. That every consumer of gas by meter shall take out a license or some other legal grant for the use of gas, and shall renew such license once in every year.
2. The fee to be paid for each license or legal grant to be in proportion to the *size* of the consumer's meter, and such fee to be determined by the Act of Parliament.
3. The penalty for neglecting to procure a license, or any other legal permission fixed upon, be of sufficient an amount to ensure the safety of the clause.
4. That the inspector of meters be directed to accompany the agents of the gas companies in their quarterly visits to the consumer (at the time of taking the registrations), and shall then notify the particulars as to the size, &c., of each meter, using these particulars hereafter as a check upon those holding, applying, or renewing, their licenses.
5. The funds obtained from the licenses or legal grants to be devoted towards defraying the expenses of the Act, and be deposited in the treasury of the county, division, city, town, or borough in which they are derived.

The second or alternative plan I should suggest is that

"A rate to be levied by the parochial authorities upon the *consumers of gas*, at a sufficient poundage to defray all expenses. If fixed that none *but burners by meter*, then the views given in the fourth part of the preceding might be adopted, to ascertain those consumers by meter."

With these projects, both the small consumer and the non-consumer will be protected, as also those who burn by contract, and need not an inspector.

H. I. L.

Westminster, Aug. 31, 1860.

Register of New Patents.

521.—Thomas Lambert, of Short Street, New Cut, and Obed Wakefield, of Union Place, Lambeth, London, for "*Improvements in steam and other valves or cocks.*" Patent dated Feb. 25, 1860.

This invention has for its object improvements in steam and other valves and cocks. When valves or cocks are employed in applying steam for heating and other purposes, and also when supplying water and other fluids, it is desirable that the persons attending to the cocks or valves should have a ready means of ascertaining the extent to which the valve or cock is open, and also when it is closed. Now if the construction of the valve or cock is such that in order to open or close the passage through the same it is necessary to cause the spindle of the said valve or cock to make more than one complete revolution, this information cannot readily be obtained by inspecting the position of the spindle.

According to this invention a pointer and graduated scale are applied to the valve or cock in such manner, that when the spindle of the valve or cock is moved to open or close the passage, the pointer (or it may be the graduated scale) shall be moved so as to indicate the position of the parts of the valve or cock. In order that the divisions on the graduated scale may not require to be very minute the pointer is caused to be moved through a greater distance than the valve of the valve or cock. It is preferred that the movement of the valve and of the pointer should be by means of screws on the spindle or stem of the valve, the screw for moving the pointer being arranged to move the pointer through a greater space than that through which the valve is moved by its screw; or, in place of the pointer being moved by a screw, a spiral or incline may be used and moved by the rotation of the spindle of the valve.

541.—John Allen Bassett, of Salem, Massachusetts, U.S.A., for "*Improvements in the manufacture of gas for illuminating and other purposes.*" Provisional protection only obtained. Dated Feb. 27, 1860.

This invention has for its object improvements in the manufacture of gas for illuminating and other purposes, and consists in passing steam, generated in a suitable boiler or apparatus, into a retort or vessel containing coke or suitable material in a highly heated state, and also through heated pipes. This treatment decomposes the steam and converts it into an inflammable gas. This gas, after passing through a cooler (where any undecomposed steam is condensed), is caused to bubble through a liquid and volatile hydrocarbon, and is then again caused to pass through a highly heated retort; by which treatment the mixture of the gas with the vapour of the hydrocarbon, which it takes up in passing through it, is converted into a permanent gas of great illuminating power.

549.—Magnus Manson, of Edinburgh, gas-meter maker, for "*Improvements in gas-meters.*" Patent dated Feb. 28, 1860.

This invention relates to the arrangement and construction of wet gas-meters in such a manner as to ensure an accurate indication of the flow of gas through them, whether the pressure from the inlet be great or small.

Under one modification, the chamber of the meter in which the measuring-cylinder or drum is contained, is sufficiently enlarged to contain the float, which is by preference of a globular figure. The spindle of the float is arranged in an inclined direction, its lower extremity being connected to one end of a bent lever of the second order, which is centred on a stud projecting from the face of the meter casing. This bent lever extends out from the main chamber of the meter, under a vertical partition, and into the front box or compartment, in which the inlet-valve is fitted—the spindle of the valve being connected with the lever near its centre, taken longitudinally. The gas passes down the overflow-tube into the measuring-chamber, and away to the outlet in the usual manner. If, now, the water in the three compartments of the meter—viz., the interior of the meter itself, the measuring-chamber, and the front box—is at such a level that the valve is just, or barely, shut, no gas will enter; but on one or more burners being lighted, the water in the measuring-chamber rises, on account of the escape of a portion of the confined gas through the outlet. The rising of the water in the meter causes a corresponding elevation of the float, which opens the valve, and allows the gas from the main to enter—the influx of gas depressing the water in the front box or valve-chamber. As further demands are made upon the meter by increased consumption, the demand is met by a corresponding rise of the float, and a proportionate opening of the valve. The spindle of the float is inclined, so as to admit of its being screwed into and out of the bent lever by means of a key inserted from above.

Another improvement consists in arranging the inlet-valve and overflow-pipe of ordinary meters, in a compartment apart from the other chambers of the meter, so as to make them equal in performance, or nearly so, to the arrangement first hereinbefore described.

Under another modification, the meter is arranged upon what is called the compensating principle, or, in other words, to obtain accurate measurement, irrespective of the water level. On the spindle of the drum or measuring-cylinder, is a segmental wheel, the teeth of which gear alternately with a double rack, the stem of which is carried upwards and centred on a stud. On the stem of the rack are two pins, projecting out from the face, and between these pins is fastened the free end of a reciprocating-bar, which is centred on a stud fixed in the bent lever connected to the float. The upper end of the reciprocating-bar is furnished with two pawls which take into the teeth of two ratchet wheels arranged above and gearing with each other. On the spindle of one of these wheels is a pinion or endless screw, to convey the motion to the index above for showing the consumption of gas. The evaporation of the water increases the capacity of the measuring portion of the cylinder, but as the water decreases, the fall of the float carries down the vibrating bar, which causes the upper part to vibrate through a larger arc, so that the pawls move a greater number of the teeth of the ratchet wheels. In this manner, as the measuring portion of the cylinder becomes enlarged, the index is moved in a corresponding ratio. In this way the quantity of gas passed through the meter is accurately measured and indicated on the dials, notwithstanding the gradual diminution of the water contained in the meter, this alteration in the water level being compensated for by the mechanical arrangements connected with the float. With a view to regulating the valve with nicety, it is preferred, in some cases, to have the stem of the float made tubular, and to come just up to an orifice in the casing of the meter. The tubular stem is carried down inside the float, and partially divided at about the centre of the float in such manner that shot or other matters passed down the stem fall through the lateral aperture. Care is taken to make the float lighter than is required in practice; and when the meter is being adjusted, small shot are dropped down the stem of the float until it is of the proper weight, upon which the aperture is then closed. With these several improvements, this wet gas-meter is rendered a far more accurate and reliable instrument than those of the ordinary kind.

The claims are for—

1. The general arrangement and construction of gas-meters of the wet class, as described.
2. The system or mode of arranging and constructing gas-meters in which the valve for regulating the flow of the gas from the inlet to the outlet-chambers is connected to a lever of the second order, to the free extremity of which the float is attached, so as to regulate the valve as described, or any mere modification of the same.
3. The system or mode of arranging and constructing gas-meters of what are termed the compensating class, in which the varying height of the water in the meter is compensated for by a self-acting arrangement of levers, which are lengthened or shortened according to the position of the float, as described.
4. The mechanical arrangement for actuating the indicating train of wheels, as described, or any mere equivalent therefore.

573.—David Chadwick, of Salford, in the co. of Lancaster, gentleman and Herbert Frost, of Manchester, engineer, for "*Improvements in apparatus for measuring water and other liquids.*" Patent dated March 1, 1860.

This invention relates firstly, to a modification of an arrangement for which letters patent have been already granted to the present patentees (No. 1200—April 28, 1857). In that arrangement they availed themselves of the force of the fluid, and caused it to act upon the pistons or other such apparatus not concerned in the measurement, so as to shift the valves. That principle is adopted in the present invention, but the patentees now employ a piston, placed in a chamber constituting a continuation of the measuring-cylinder, and cause the rod thereof to pass through the piston in such measuring-cylinder; after which it is connected to the valve or valves by which the fluid is admitted and allowed to pass out. Upon the piston in the measuring-cylinder having arrived at a certain point it changes the position of the valve in connexion with the other piston, which, being thus brought into action, opens or closes the main induction and eduction ports. The valves are so placed as to move in the direction of the piston's motion, so that they are shifted by a direct thrusting and drawing action.

Another part of the invention is applied to those meters generally which measure by the action of the pistons, and consists in placing a

piston, and also the valves by which the fluid is admitted to and allowed to pass from the cylinders, within the said pistons.

Another part of the invention relates to the packing of pistons for water-meters. According to the method hitherto in use the pistons have been packed with leather, indiarubber, or other similar flexible material It is found, however, that an elastic metallic packing may be used with advantage, no t heretofore attained, and this part of the invention consists in that substitution. The metallic packing may either be expanded to fit the cylinder by springs or by the pressure of the water in the measuring-chamber.

The claims are for—

1. The application to apparatus for measuring water and other liquids by the action of a piston working in a measuring-cylinder of an additional piston for working the slide-valve of the measuring-cylinder.

2. The improved arrangement of valves, shewn in the drawings attached to the specification, and the mode of working the valve of the piston by means of the piston-rod working through the piston-rod of the piston in the measuring-cylinder.

3. The application of the additional piston and valve for working the valve of the measuring-cylinder within the piston of the said measuring-cylinder.

4. The application of metallic packing to the pistons of water-meters.

579.—John Henry Johnson, of 47, Lincoln's-Inn-Fields, London, and 166, Buchanan Street, Glasgow, gentleman, for "*Improvements in gas-regulators or governors.*" A communication from Adolphe Christophe, of Paris. Provisional protection only obtained, March 1, 1860.

This invention relates to a peculiar construction, arrangement, and combination of apparatus for regulating the pressure of gas before entering the service-mains, and consists in the combination of two apparatus, the first of which consists of a conical or other valve fitted inside the principal main at the works, and capable of closing, or partially closing, the orifice through which the gas passes, according to the pressure of such gas. The orifice above referred to communicates with a chamber which is in connexion with the main, and also by a pipe of smaller diameter than the valvular orifice, with an inverted vessel or bell contained in a reservoir of water. This vessel or bell is suspended by a central chain or cord, which is counter-weighted according to the pressure of the gas required in the service-mains. A chain or rod connected to the roof of the bell passes down the pipe which conducts the gas thereto, and is attached at its lower end to the conical or other valve above referred to. It is thus obvious that, as the gas enters the bell and lifts it, this latter, by its rising, will simultaneously elevate the valve, and contract more or less the orifice through which the gas has to pass before reaching the bell. On the bell being filled with gas, the latter passes off through a second passage leading to the service-mains, but of course at a certain regulated pressure determined by the counterbalance weights above referred to.

619.—George Walcott, of 24, Abchurch Lane, City of London, civil engineer and contractor, for "*An improved receptacle or receptacles for generating gas.*" Patent dated March 7, 1860.

This invention has for its object, in the first place, the obtaining of more perfect action of fire than has hitherto been practicable in gas retorts and ovens, by placing the flue or flues through the material or materials intended to be converted into gas, and, on the principle to be hereafter described, by which means the fire heretofore lost (by the reverse sides of flues and covering brick arches of retort-beds not coming into contact with the parts required to be heated) is beneficially used. The second part of this invention is an arrangement for a more effectual mode of loosening and destroying the incrustation that occurs on the inner surface of a sealed vessel or vessels used for generating gas, by the principle of having a vent opening or openings, with draft-pipes, in such part or parts of said sealed vessel or vessels as will admit a current of air to pass through the same, when required, on the lid or lids being wholly or partially removed.

The plan recommended by the inventor for carrying out the first part of this invention is as follows—viz., for carbonizing about 30 cwt. of coal daily for gas purposes, it being, nevertheless, clearly understood that modifications of the principle of this invention, with different dimensions, may be arranged for carbonizing any other quantity of coal or heating other materials. To any ordinary furnace, branch flues are to be built, having their opening or openings in the front part of the furnace, and also one, two or more flues, as may be deemed expedient, to issue from the latter end of the furnace, the said flues being carried up so as to form a longitudinal flue, say at 12 inches or thereabouts, above the top of the covering over the furnace, which covering can be made with abutments or four separate arches of fire-brick, or, if preferred, a solid arch of fire-bricks or lumps from end to end. If separate, the arches may be 4½ inches deep by 9 inches long, the arches or abutments being covered with a substantial arched or other description of fire-tile or tiles made gas-tight. The upper surface of this tile is to form the floor of the first receptacle, and which it is intended shall form a sealed vessel for carbonizing coal or heating other substances.

The upper part of the first receptacle is the lower part of the first longitudinal flue, and is made saddle-shaped, in transverse section. The sides of the first receptacle are partly formed by the concave form of the longitudinal flue, also by the flues bifurcating from the furnace before forming the first longitudinal flue, also by fire-clay blocks or lumps or abutments resting on the tile or tiles over the furnace, and abutting against or protruding from the side walls, forming the chamber, the receptacle being about 12 inches high, 18 inches wide, and 7 feet long. The firstly above-described longitudinal flue, laid the whole length of the furnace, or nearly so, is turned upwards, and then returned to the front, where the bend occurs; the innermost or auxiliary flue or flues, forming the end part of the furnace, may be connected, the longitudinal flue being about 20 inches broad by 4 inches deep, and bow-shaped transversely.

Another receptacle, somewhat similar to the first, is formed partly by the second longitudinal flue. A few inches deep on both sides of this (the second) receptacle are formed from fire clay blocks, lumps, or abutments, the ends being formed by the turning of the flue. The longitudinal flue is bifurcated and carried up to form another (the third) longitudinal flue in a manner somewhat similar to what has been already described The saddle-pipes or flues, or any one of them, may be constructed separately, or in such part or parts as may be deemed expedient. All waste cavities not being flues or receptacles, may be filled in with some non-conductor of heat and sealing substance, or fire may be returned through them. An external side-flue may be built, if deemed expedient, for the purpose of working only the lower receptacle at such times as may be desired.

A further additional receptacle or receptacles may be formed by the extension of the already described longitudinal flue, with or without auxiliary flue or flues, direct from the furnace; but in this instance, the three receptacles already described would be sufficient for carbonizing 30 cwt. of coal daily. Or, instead of this, receptacles may be formed wholly or in parts, and so arranged for carrying out this invention by forming the flues between them by means of either fire-clay blocks or lumps, abutments, tiles, pipes, &c.

Further receptacles may be arranged in two or more rows, with a furnace or furnaces under them for a set of receptacles; or instead, furnaces may be placed one above the other, and the receptacle on each side with flues proceeding horizontally and transversely. The walls enclosing the sides and back of the receptacles may be made of brickwork, or the receptacles may be formed of large size of metal lined with fire-clay work, or solid brickwork; and the flue or flues as already described, or any other kind of flue or flues placed therein for the passage of the fire, the material or materials to be acted upon by fire being filled into the intervening space in the manner that may be deemed the most expedient.

The second part of this invention consists in having the vent-opening or openings in such part or parts in a receptacle as may be considered suitable, the said vent or openings to have a pipe or pipes for connexion to a main-pipe or pipes, or main-flue. Any number of receptacles may have vent-openings, and be connected singly or in sets, and sealed together or separately when not in use. It is desirable that the vent-openings have an exit in the chimney-shaft. Any receptacle or receptacles may be constructed with all or part of the appliances or requisites in common use, in connexion with the generation or production of gas.

The claims are for—

1. Various arrangements of flues for economizing fire—one made avoiding the expense of brick arches as generally used over commonly constructed apparatus for generating gas.

2. A draft-pipe or pipes to a vent-opening or openings for creating a draft in receptacles when the mouth-piece, lid, or lids, is, or are, partially or wholly removed, or when air is admitted into a receptacle—meaning by the word receptacle any vessel used for producing or generating gas.

3. The general arrangement and construction of apparatus for generating gas, or for heating purposes, as hereinbefore described.

PROVISIONAL PROTECTION

HAS BEEN GRANTED FOR THE UNDERMENTIONED INVENTIONS.

2009.—Edward Bridgman, of Tarragona, in Spain, gentleman, for "*Improvements in the construction of wet gas-meters.*" Aug. 21, 1860.

2010.—Hugh Greaves, of 7, Besborough Gardens, Pimlico, London, Gentleman, for "*Improvements in the construction of railways, tramways, or tracks for carriages, and in the appliances for the conveyance of passengers, parcels, and letters thereby.*" Aug. 21, 1860.

2018.—Robert West, of Walsall, in the co. of Stafford, gas engineer, for "*Improvements in the construction of wet gas-meters.*" Aug. 22, 1860.

2070.—Colin Mather, of Salford, in the co. of Lancaster, engineer, for "*Improvements in gas singeing apparatus.*" Aug. 27, 1860.

2038.—Antoine Halter, and Francoise Decorce Widow Dourad, of 91, Rue de Malte, Paris, for "*Improvements in the manufacture of flexible tubes for the conveyance of water, illuminating gas, or other fluids.*" Aug. 24, 1860.

2085.—William Henry Wain, of Birmingham, brassfounder, and William Instone, of Wolverhampton, gas-fitter, for "*A new or improved lamp.*" Aug. 29, 1860.

NOTICE HAS BEEN GIVEN OF INTENTION TO PROCEED WITH THE UNDERMENTIONED INVENTIONS.

1861.—Joshua Jackson, of 29, Queen Street, Wolverhampton, in the co. of Stafford, for "*Purifying and cooling water, and atmospheric air, which he calls 'the carbonic ærial water, and air purifier and cooler.'*" Aug. 1, 1860.

1077.—Andrew Linmere Dowie, of Glasgow, N.B, merchant, for "*Improvements in gas-burners, and in pressure regulating apparatus for the same.*"

1134.—John Henry Johnson, of 47, Lincoln's Inn Fields, London, for "*Improvements in pipe couplings.*" A communication. May 7, 1860.

1207.—Alfred Vincent Newton, of 66, Chancery Lane, London, for "*An improved mode of heating oils, for the production of gas and volatile oils.*" A communication. May 16, 1860.

1480.—Thomas William Keates, of Chatham Place, Blackfriars, London, consulting chemist, for "*An improved mode of separating carbonic acid gas, from the gaseous products derived from the distillation of peat and other vegetable matter.*" June 18, 1860.

Legal Intelligence.

BRISTOL POLICE COURT.

WEDNESDAY, AUG. 29.

CONVICTION FOR FRAUDULENTLY CONSUMING GAS.

Mr. *John Hill*, tailor, of Bridge Street, appeared before Messrs. Bigg and Barrow (Mr. Lane, a gas director, having withdrawn from the bench) to answer an information charging him with having laid, or caused to be laid on, to the gas company's main, a service-pipe, without having given notice to

the company, contrary to the Act, &c. Mr. ALFRED BRITTAN appeared on behalf of the Bristol United Gas Company.

The defendant admitted the fact, but was anxious to give an explanation. He said he had been having some extensive alterations made on his premises, and new gas-pipes laid down throughout. The gas-fitter had not been able to complete his work until the builder had finished, but the new pipes had been affixed to the burners through the house. After the gas-fitter had gone as far as he could with the work, he found that he was without a light at his desk, the only place where it was particularly wanted. There was a place where a joint had been in the main, and he had a branch put on there to feed the light on the desk. He asked the gas-fitter if he thought it would be allowed, by his paying the company, and he said, "Oh, yes; they can see very well what it is." When the meter inspector came, he went down into the cellar with him, and pointed it out. He said it was not allowed by the company. He (defendant) said he knew it was not allowed as a general thing. He said he must report it; and he replied, "Of course you will; I shall expect that you will." He afterwards saw Mr. Fiddes, the company's engineer, explained to him the circumstance, and showed him the new pipes. Mr. Hill said there was no intention on his part to defraud the company.

Mr. BARROW supposed he was urging those facts in mitigation of penalty.

Mr. WILLIAMS said the magistrates had no power to mitigate it, but they could recommend it to the company.

Mr. BRITTAN said Mr. Hill had called on him and admitted the facts of the case, but both himself and the gas-fitter knew they were acting in contravention of the company's Act, and observed that the pipe had been allowed to remain three weeks, and when the inspector discovered it he went to the company. If the magistrates expressed an opinion on the case, he should be happy to convey it to the board of directors.

The magistrates then inflicted the full penalty of £5 and costs, but did not express any opinion.

A second information against the same defendant was also heard, for having, on the 23rd of August, permitted a pipe to continue attached to the company's pipe which had been previously laid on without their consent. This case arose out of the other, and the defendant admitting it, was fined 40s. and costs.

Mr. BRITTAN promised to represent the facts of the case to the company.

The amount of the fines and costs (£7. 17s.) was immediately paid.

Charles Jones gas-fitter, of Earl Street, then appeared in answer to a third information, charging him with having, on the 22nd of August, laid a pipe on the company's main without their consent, contrary to the Act, &c. The defendant pleaded guilty, and gave a similar narration of the circumstances as in the previous case. Mr Hill said he had acted entirely under his direction. In this case Mr. Brittan ultimately withdrew the information, remarking that the only object of the company was to show to gas-fitters that they could not attach pipes in the manner stated without committing a breach of the company's Act and incurring heavy penalties.

Miscellaneous News.

COUNTY AND GENERAL GAS CONSUMERS' COMPANY (LIMITED).

The Ordinary Half-Yearly Meeting of the Company was held at the Offices, King William Street, London Bridge, on Thursday, Aug. 30—E. H. J. CRAUFURD, Esq., M.P., in the chair.

The SECRETARY (Mr. R. S. Parker) read the following report of the directors. The balance-sheet and profit and loss account having been previously printed and circulated among the shareholders, were taken as read:—

The directors beg to submit the balance-sheet and accounts for the half year ending 30th June, 1860.

Out of the 2000 preference shares which the directors were authorized to issue under the special resolution of 29th May last, 1895 shares have been allotted and paid on, besides 205 ordinary shares, showing a total increase of 2100 shares on the register, and £7025 added to the paid-up share capital. Out of this sum upwards of £5000 has been applied to the reduction of debts and liabilities.

Owing to unexpected delays in completing the legal conveyance of the Ware Works, the company did not enter into possession until the 30th of June, and consequently no charge on that account appears beyond the sum of £708. 17s. 1d., being deposit on account of purchase money, and sundry expenditure on capital account for repairs and materials required to put the works into an efficient state.

After providing for the Christmas dividend, and all outgoings and interest on loans for the past half year, a total profit has been realized of £238. 14s. 5d.; out of this sum the directors have set apart £43. 6s. 11d. as the commencement of a reserve-fund to meet contingencies, leaving a balance profit of £215. 7s. 6d., which will be sufficient to pay a dividend, for the half year ending 30th June last, at the rate of 6 per cent. per annum on the preference shares, and 5 per cent. per annum on the ordinary shares. And the directors recommend the declaration of a dividend accordingly, to be made payable on and after the 1st October next.

Dr. *Balance-Sheet to June 30, 1860.* *Cr.*

CAPITAL AND LIABILITIES.

Capital—			
Received from sundry shareholders, viz.:—			
£5 per share on 1572 ordinary shares	£7,860 0 0		
£5 " " 1120 preference "	5,600 0 0		
£1 " " 265 ordinary "	265 0 0		
" " 775 preference "	775 0 0		
		£14,500	0 0
Total shares on register 3732			
Debts and liabilities—			
Debentures and loans	£4,950 0 0		
Mortgage on Lea Bridge works	3,000 0 0		
Acceptances for goods supplied	509 9 9		
Tradesmen and sundries	607 0 3		
Unclaimed dividends	38 12 8		
		9,105	2 8
Reserve-fund—			
Amount set aside from profits to meet contingencies		43	6 11
Profit and loss—			
Balance disposable for payment of dividend		215	7 6
		£23,863	17 1

PROPERTY AND ASSETS.

Property held by the company—			
Pater and Pembroke works—leasehold	£4,668 14 3		
Northfleet—ditto	937 11 10		
Chertsey—freehold	2,416 2 10		
Walton-on-Thames—ditto	4,759 14 5		
Lea Bridge—leasehold	6,662 16 2		
Ware—freehold	708 17 1		
	£20,153 16 7		
Stock in trade at sundry works £950 9 1			
Office furniture and fittings 100 9 0			
Preliminary expenses incurred in formation of company 738 12 9			
	1,789 10 10		
		£21,943	7 5
Debts due to the company—			
Bills receivable, and sundries	£ 238 18 11		
Gas and meter rental, &c., in course of collection by district agents	1,266 19 0		
		1,505	17 11
Cash—			
Cash at bankers	£412 2 3		
Petty cash—balance in hand	2 9 6		
		414	11 9
		£23,863	17 1

Dr. *Profit and Loss Account.* *Cr.*

To dividend declared at meeting held Feb. 28, 1860			£144	6 10	By balance, from Dec. 31, 1859		£159	11 7
Coals carbonized	£704	6 8			Gas and meter rental	£1,841 11 1		
Lime and purifying materials	32	7 3			Products and sundries	301 9 2		
Wages and labour	303	3 0					2,143	0 3
Rent of sundry works	137	7 2						
Local rates and taxes	40	1 9						
Commission and agency fees	77	15 0						
Miscellaneous and petty charges at works	93	2 1						
			1,388	2 11				
Office expenses, including auditors' fees, rent of offices, salaries, and petty expenses	£164	17 3						
Law charges	9	14 10						
Advertising	4	17 0						
Stationery	21	15 3						
			201	4 4				
Interest account			310	3 4				
Reserve-fund			43	6 11				
			£2,087	4 4				
Balance—profit			215	7 6				
			£2,302	11 10			£2,302	11 10

The CHAIRMAN: Gentlemen, it now becomes my pleasing duty to move that the report be adopted, or rather to lay it before you that you may adopt it, in the usual form we have followed on these occasions. I think we may congratulate ourselves upon the continued satisfactory, although slow, progress of the company. We have acquired some works at Ware, but unfortunately, as often happens with the lawyers, there was a delay in carrying out the details of the purchase, so that, instead of entering upon the possession of them on the 30th of March, we did not enter into possession until the 30th of June, and consequently no charge on that account has accrued. On the other hand, we have avoided a very light quarter's rental, so that there is some compensation for the delay. Of course, at present it is impossible to say what those works may be worth to us, and we have made no estimate; but, as far as we know, there is considerably more gas sent out there than at the Lea Bridge works. With the exception of the deposit on account of the purchase-money, there has been very little addition to the capital. There has been a very satisfactory reduction of our debts and liabilities, and our balance-sheet presents a gratifying contrast to that of the last half year, for, whereas on the 31st of December our share capital was £7508, and our loan capital something between £13,000 and £14,000, we have now a paid-up share capital of £14,500, and our loan capital is something short of £8000. The £9105 which appears as the amount of debts and liabilities includes acceptances for goods supplied and tradesmen's bills, which of course I do not reckon. The debentures and loans, and mortgage on works, being short o £8000, is a very satisfactory circumstance, and one, I think, which may induce the public to take off our shares a little more rapidly than hitherto. We have set out the profit and loss account in the way that is usual with companies—grouping the local working charges and the expenses at the head office. There is rather a heavy charge for interest, but this will be gradually reduced. The result of the half year's working is, that we are left in so satisfactory a position as to be able to pay our promised 6 per cent. to the preference shareholders, and the 5 per cent. that we have hitherto paid to the holders of ordinary shares. We have also begun, what is always a very good thing, the formation of a reserve-fund; and, though the amount we are able to carry to that account is but small, there is nothing like a beginning, because it is sure to accumulate when you have once got a peg to hang it on. All we now want is, that our good friends the proprietors should, as hitherto, continue to exert themselves to extend the share capital of the company. We have in view one or two works which we believe would be very advantageous to the company, but of course it is not wise to hurry into purchases until we see that we are thoroughly supported by our proprietors. It is a very satisfactory feature with reference to our share capital that during the last half year the number of shares, which were 1632, has been increased to 3732, and that, with one or two exceptions, this increase of capital has come out of the pockets of our old proprietors, showing the confidence they have in the

concern, and affording to the public ample security in coming in to invest their money. I am not aware that there is any other remark necessary, and will only add that the directors will be happy to answer any questions which may be proposed to them in elucidation of the accounts now laid before you.

Mr. MORRISON then moved, and Mr. OHREN seconded—"That the directors' report and balance-sheet, with the auditors' report, now read, be received, adopted, and printed for circulation."

The motion was put and carried unanimously.

The CHAIRMAN proposed the dividend recommended in the report, which was agreed to, and made payable on and after the 1st of October next.

The CHAIRMAN: This, under ordinary circumstances, would have closed the business of the meeting; but the directors have given notice of their intention to submit a further resolution, and I will shortly explain the reason why we wish to have that resolution added as an article of association to table B. Up to this time we have been of opinion, and indeed still are of opinion, that under table B—which directs that all the powers exercised by the company which shall not require to be exercised in general meeting shall be exercised by the directors—we have sufficient power to manage all the usual trade and business of the company, making payments, receiving moneys, and borrowing what might be necessary to be borrowed for carrying on those trading concerns while your income is being realized. Our own legal adviser also entertained the same opinion, and a decision has been given in one of the Chancery Courts, by Sir William Page Wood, clearly in the same direction. But during the last half year we have been settling the balance outstanding on the Lea Bridge works of £3000, which required to be paid off at the close of the second year after coming into possession, and which sum we have raised on security of the property from another mortgagee. Unfortunately, it happens that lawyers will differ, and the counsel of that mortgagee was of opinion that, in consequence of another decision in the Court of Chancery, which appeared to throw some doubt upon the opinion of Sir William Page Wood, but for which neither our counsel nor the board believed there was any foundation, it would not be right for him to advise his client to advance his money on mortgage of the property unless the proceedings of the directors were sanctioned by a special resolution of the proprietors, such as that we now propose for your adoption. Although, therefore, we believed, and still believe, that the matter is fully within the powers and privileges of the directors, we ask you to put in explicit words what we contend is already within the four corners of our table B. The resolution is in a form which has the approval of our legal adviser and the legal adviser of the mortgagee, and in that form we ask your approval of it. It gives us no powers beyond those we already possess, and it is only intended to meet the difficulty which has been suggested under the circumstances I have stated. If you approve of it, we shall have to call a special meeting for the purpose of confirming your decision. With these remarks, I beg to move—"That the directors may from time to time borrow such sums of money as they may require, either for the conduct or for the extension of the business of the company, and for that purpose may issue debentures or mortgage the property of the company to such an amount, for such periods, and under such terms and conditions as they may deem expedient."

Mr. MORRISON seconded the resolution, which was unanimously agreed to, and the 1st of October appointed for the special meeting to confirm its adoption.

On the motion of Mr. ERASMUS WILSON, a vote of thanks to the secretary, engineer, and auditors of the company, was cordially adopted.

Mr. PARKER (the secretary) appropriately acknowledged the vote.

A vote of thanks to the chairman and directors closed the proceedings.

LIVERPOOL UNITED GASLIGHT COMPANY.

The usual Half-Yearly Meeting of the Liverpool United Gaslight Company took place at the offices, Newington, on Tuesday, August 21st—HARDMAN EARLE, Esq., in the chair. The directors submitted the following report:—

In pursuance of the resolution of the proprietors, passed at their meeting in February last, the directors sold, on the 1st day of June last, 500 £25 shares, which realized £25,079, of which sum £12,579 consisted of premiums.

The 500 £25 shares, which were sold as above-mentioned, have been fully paid up, and the directors will submit to the proprietors a resolution converting the amount of the same shares into consolidated stock.

The accounts, which will be submitted to the proprietors, show that the profits of the company for the year ending the 30th day of June, 1860, fall short of the amount requisite to pay the annual dividend by the sum of £3672. 2s. 6d.

It will be necessary to take the above sum of £3672. 2s. 6d. from the reserved fund, in order to pay the usual dividends, leaving a balance in such fund of the sum £6102. 10s.

The proprietors will remember that for the year ending the 30th of June, 1859, it was necessary to take from the reserved fund the sum of £5599. 11s. 1d., which was principally caused by the reduction which had been made in the price of gas, and also in the increased price of cannel; but for the year ending on the 30th of June last the sum to be taken from the reserved fund is only £3672. 2s. 6d.

The directors, however, have satisfaction in stating that the business of the company has considerably increased in the last year, and they have every reason to believe that ere long the deficiency above-mentioned will be fully made up by the enlarged consumption of gas.

The directors recommend that the dividend for the half-year ending the 30th of June last be £5 per cent. on the consolidated stock of the company.

The directors beg to inform the proprietors that, on the death of Mr. Daniel Mather, they elected Mr. Charles Turner a director of the company, in the place of Mr. Mather, and that Mr. Turner, with the three following gentlemen, retire by rotation from the board of directors, but are eligible for re-election, viz.: Mr. James Bateson, Mr. Joseph Cooper, and Mr. John Stewart; and that Mr. James Radley, one of the auditors, retires by rotation, but is eligible for re-election.

The CHAIRMAN, in moving the adoption of the report and statement of accounts, thought they must agree that they were extremely satisfactory. It was true they had been obliged to trench upon their reserve-fund, but not so much as last year; and there was every reason to believe that the sum would be entirely recovered by the increase of consumption that was now taking place. They would have observed, no doubt with some alarm, that a great many bills had been introduced into Parliament during the last session, all hostile to the gas interest. Several of them had been withdrawn, and only two had passed into law. One was a very innocent one, which would postpone the time when Lord Redesdale's bill should come into operation, the object of which was to establish a uniform mode of measuring gas. The other was by no means a good bill for the gas interest. It was the most inquisitorial, the most dictatorial and objectionable bill they could possibly conceive; but through the exertions of the gas companies, and, he ought to add, the sense of justice of the House of Commons, the objectionable clauses had been removed, and the bill was now passed in an amended form. They might consider their property safe till Parliament met again. How long that would be he could not say, because there was always something objectionable introduced against the gas companies.

Mr. BRANCKER seconded the adoption of the report, which was agreed to.

On the motion of the CHAIRMAN, seconded by Mr. C. TURNER, a dividend of 5 per cent. for the half year was declared.

The CHAIRMAN proposed that the 500 £25 shares referred to in the report be converted into consolidated stock, such conversion to take effect from the 1st of September next, and to be divided amongst the shareholders in proportion to the amount of their shares.

Mr. MOZLEY seconded the motion, which was passed.

The following directors were re-elected:—Messrs. C. Turner, James Bateson, J. Cooper, and John Stewart; and Mr. James Radley was re-elected one of the auditors.

A vote of thanks having been passed to the chairman, the proceedings terminated.

WOLVERHAMPTON GAS COMPANY.

The Seventeenth Half-Yearly Meeting of Proprietors in this Company was held on Tuesday, Aug. 28, at the Works in Horseley Fields—J. WALKER, Esq., in the chair.

Mr. PROUD, the company's engineer, read the directors' report, which stated that the income from all sources for the half year ending June 30 was £11,949. 19s. 10d., and the expenditure £8224. 1s. 4d., the balance being the profits of the half year amounting to £3725. 18s. 6d. From this sum the directors recommended the payment of the usual dividend of 5 per cent., amounting to £3558. 8s., payable on and after Wednesday, Sept. 5, and the addition of the remainder, £167. 10s. 1d. to the reserve-fund. The enlargement, extensions, and renewal of the mains, alluded to in last half year's report, had all been completed. The most careful attention had been given to insure the work being done in the best manner; and it was anticipated that good results would accrue in the more uniform diffusion and equalized pressure of gas in all parts of the town. The directors were now arranging to light the Bushbury Junction of the London and North-Western Railway Company under a contract for a term of years. In conclusion, the directors assured the proprietors they would continue to devote their best attention towards the furtherance of the interests committed to their care.

The CHAIRMAN then moved the adoption of the report, and said the balance proposed to be carried to the reserve-fund was smaller than usual, owing to the heavy expenditure incurred in various parts of the town in the renewal and enlargement of the mains. The proprietors would also bear in mind that the gas consumed during the past half year had been charged for at a reduced price upon any preceding period. The directors believed that by lowering the price of gas they would bring about an increased consumption, and in this way they hoped to satisfy the public, and, by exercising vigilant supervision over their works, to meet the wishes of the proprietors also.

Mr. J. COOPER seconded the adoption of the report, which was carried.

The payment of the dividend was also moved, seconded, and carried.

Mr. READY moved a vote of thanks to the directors for their attention to the interests of the company during the half year. He said he was of opinion, after having carefully examined the balance-sheet, that the concern was in a very healthy state; and he believed with the chairman that reductions in the price of gas would not only be satisfactory to their customers, but lead to an increased consumption of the article.

The CHAIRMAN acknowledged the vote, and the proceedings, which were of a brief and pleasant character, terminated.

UNITED GENERAL GAS COMPANY.

The Ordinary Half-Yearly General Meeting of Proprietors of this Company was held on Tuesday, Sept. 4, at the Offices of the Company, Austin Friars—J. O. HANSON, Esq., in the chair.

The SECRETARY read the notice convening the meeting, and also the following directors' report:—

Gentlemen,—This half-yearly general meeting has been convened in compliance with the provisions of the company's charter; and in laying before the proprietors a report of the last half year's operations, it will be seen that the profits amount to £5754 against £6089 for the corresponding period last year. This falling off is attributable to the increased rates of freights for coals to Dublin and cost of cannel; on the other hand, the improvement in the rental exhibits a large increase of customers. The important extensions of works and mains at Dublin, referred to in the last report, are being rapidly carried out this summer. The new tank is completed, and the contractor has the large gasholder in hand, which your directors hope will be finished for the next winter's operations. The business at the works having considerably increased, your directors deemed it advisable to appoint an experienced resident engineer, who could give his undivided attention to the manufacturing department, and they are happy to inform you that they have obtained the services of one who, they doubt not, will realize their expectations. The several additions to, and alterations of, the works and district mains at Dublin still require a considerable outlay.

At Limerick, the business steadily increases. The new tank is ready, and the gasholder under contract for completion by November next. Your directors feel assured that when the enlarged apparatus at present erecting is finished, the winter's operations, both in manufacture and supply, will be improved, and this station altogether rendered capable of any demand likely to be made upon it for some time to come. Your directors beg to recommend the proprietors to declare a dividend at the rate of 12s. 6d. per share, free of income-tax, out of the profits of the past half year, and the surplus to be carried to the stations contingency account, as heretofore.

Three of your directors, Mr. Bell, Mr. Boetefeur and Mr. Chapman, and Mr. Rew, one of your auditors, go out of office this day by rotation, and being eligible, offer themselves for re-election.

The CHAIRMAN: Gentlemen, in laying these accounts before you, I am sorry, as far as our dividend is concerned, that we are not able to give you so satisfactory an account as we generally are in the habit of doing. It is the June half year, and sometimes the profits of that half year we find do not amount to the same sum as that which they reach in the December half year. Compared with the corresponding period of last year, there is a slight falling off of something like £335. It has always been the habit of the directors to give the proprietors as good a dividend as we possibly can. We pay them the dividend that we have made, and we find that we shall have a small surplus of only £129 after paying the dividend. The report alludes, I think very fairly, to the circumstances which have caused a diminution in profits this half year—viz., the increase in the cost of coals. I do not know that the consumption of coal has been unusually large, but the cost at Dublin alone is 1s. 4½d. per ton more than in the corresponding period of last year. That alone makes a cost of £2398, against which we have, as the report states, an increased rental of £1883, leaving us short by about £500. The same increase in the cost of coal has occurred at Limerick. There I find the increase per ton is 3s. 4d., which amounts to £354 as extra cost of coal, whilst the rental is only £175 more. That will account, in a very great measure, for the falling off in the profits of the June half year. I might allude also to another subject, which I think should be borne in mind, and it was mentioned in the report of last December—that we had a fire in Dublin, and, although the positive loss arising from that fire did not exceed £800 or £1000, the contingent losses have put us to some considerable expense. We had to give gratuities to our establishment there; we had to pay the military, who came in very opportunely, and assisted us materially in putting out the

fire; but it led to a great deal of waste of gas and tar, and destruction of cannel. But, as we mentioned to you in the last report, although we met with these difficulties at Dublin, the lighting was not disturbed for a single moment, although carried on at considerable expense, in order to keep our credit with the city. There is another item in the accounts which perhaps I may refer to: it is, the wear and tear account at Dublin. I find that we have paid more by £380 towards wear and tear in the last half year than we did in the corresponding period. There are, however, some good features in the Dublin accounts, and one is, that our bad debts only amount to £471, which upon a rental of £22,558 is just 2 per cent., a very moderate per centage, particularly in Ireland in times like the present. I may mention, also, another very favourable circumstance at Dublin, which is the wasteage account. Last year this account was 32½ per cent.; we have now got it down to 26½, so that there is a saving of about 5 per cent. With respect to our report, we allude to the outlay which has taken place at Dublin, and is still going on. We have laid out in the last half year at Dublin about £3000, but we told the proprietors that we should be called upon for a very heavy outlay. We have ordered a first-rate tank and gasholder of 120 feet diameter; it is 30 feet deep, with double lift, and will hold nearly 700,000 cubic feet of gas. Of course, a large tank and gasholder of such dimensions costs a good round sum, and we shall have to pay about £8500 when that is all completed. I should say that, although that outlay is going on, we have funds in hand to meet it. We shall not call upon the proprietors for any money; and, as the price of gas reduces, you know the consumption generally increases; and, having another company to compete with at Dublin, if we do not supply gas on such favourable terms as they do, we should be likely to lose our customers. It would therefore be very bad policy to keep our plant otherwise than in a very efficient state. I do not know that there is any other subject that needs comment, but I shall be very happy to answer any questions the proprietors may wish to put.

Mr. VAN DE WALL moved the adoption of the report and accounts.

Mr. RHODES seconded the motion. He inquired whether the amount of bad debts referred to by the chairman included all the stations?

The CHAIRMAN replied that he alluded only to Dublin.

Mr. RHODES expressed himself greatly satisfied with the appointment by the company of the new engineer, because he had some knowledge of that gentleman, and was very hopeful for the future. With respect to the accounts presented to the meeting, he considered them faithful, true, and candid; and he liked to see directors declare dividends according to the profit made, whether it was much or little.

Mr. VAN DE WALL inquired whether the extra cost of coal arose principally from freights?

The CHAIRMAN replied in the affirmative, and also added that the company had used a great deal of cannel, the cost of which had increased.

The resolution then passed unanimously.

Captain SHEA moved a resolution authorizing the payment of a dividend of 12s. 6d. per share, free of income-tax, payable on the 1st of October next.

Mr. RHODES seconded the motion, which passed *nem. dis.*

The retiring directors and auditor were re-elected, and the motion was acknowledged by Mr. BOETEFEUR on behalf of himself and his brother directors.

A PROPRIETOR inquired what the directors intended to do with the money they were receiving from the Cork Consumers Company?

The CHAIRMAN said that, until the improvements at Dublin were completed, it would be early days to talk of the disposal of the money to be received for the Cork works.

Mr. RHODES inquired whether the directors considered the investments in Canada Six per Cents. and Indian Four per Cents., safe ones?

The CHAIRMAN observed that Mr. Rhodes might be sure the directors considered so when the investments were made.

Captain SHEA moved a vote of thanks to the directors, for the satisfactory manner in which they had conducted the affairs of the company.

The resolution having been seconded, passed unanimously.

The CHAIRMAN, in acknowledging the compliment, said that whatever merits the directors possessed, if they could not command success, they could do one thing, which was, always to lay before the proprietors honest and straightforward accounts; and, whether the profits were much or little, the directors endeavoured to give a clear statement of the affairs of the company, in order that the shareholders might judge for themselves.

The meeting then separated.

SALE OF GAS ACT.

DEPUTATION TO THE TREASURY.

On Wednesday, the 29th of August, a deputation from the Gas-Meter Makers Association of Great Britain, waited upon Mr. Hamilton, Secretary at the Treasury, for the purpose of representing to the Government the position in which the trade are placed by the passing of the Sale of Gas Act Amendment Bill, which had, the previous day, received the Royal Assent, and to suggest the appointment of a commission of scientific and practical gentlemen during the recess to obtain information for the guidance of the Government in preparing for the fresh legislation, which will be imperatively called for at an early period next session.

The deputation consisted of Mr. Vickary (of Exeter), Mr. Parkinson, Mr. Defries, jun., Mr. Hartley (A. Wright), Mr. Mackay, (Messrs. Milne, Edinburgh), Mr. Boulton, Mr. Shearman, and Mr. W. Crosley (Honorary Secretary of the Association).

H. B. SHERIDAN, Esq., M.P., introduced the deputation, and stated the objects for which they waited upon the Government.

Mr. HAMILTON said he had no hesitation whatever, speaking for himself individually, and not on behalf of the Government, to state that he thought it most desirable and important that there should be a proper committee appointed with a view to consider the whole question, and to prepare for legislation next year. The subject had been too long unsettled, which must have been most injurious to the trade. The questions involved were complicated and difficult ones, and must be dealt with by practical persons. He hoped the Home Office would take up the matter with a view to prepare for legislation next session.

Mr. CROSLEY, at considerable length, referred to the proceedings in and out of Parliament during this year, and stated the difficulties in which the meter makers were placed by the passing of the Amendment Bill. He then called attention to the apparatus which had been lodged at the Exchequer, and said that, though he had not seen it, several members of the Meter Makers Association had, when on its way into the Exchequer Office, and they were under the impression that it was not satisfactory, and would fail in detecting errors in a particular class of meters. The association, therefore, were anxious that the Government should take it into their serious consideration, whether as an Act of Parliament had passed suspending the adoption of the Sale of Gas Act for another year, it would not be a more convenient course to postpone any steps officially in reference to that apparatus until further legislation had taken place. They urged this point the more strongly because there was only one inspector appointed in the metropolis under the present statute, a circumstance which might give rise to undue advantage, being taken by certain parties to the prejudice of the trade at large.

Mr. SHERIDAN intimated that the opinion of the Home Secretary was favourable to the appointment of such a committee as he had suggested.

Mr. CROSLEY said the views of the association of which he was honorary secretary were, that on such a committee, the gas companies, the dry and wet meter makers, the Government, and the public at large, should be represented.

After some other members of the deputation had been heard,

Mr. HAMILTON said, as he had already observed, his own individual opinion was in favour of a committee or commission to investigate the question, and he would take care that the suggestions which had been offered in reference to the constitution of that committee if such an one were determined on, should be laid before the Government. He sincerely hoped that that course would be adopted, because he believed it was the best way to settle the question. He was not, of course, prepared to give an opinion upon the other suggestion—viz., that the Treasury should suspend all action in reference to the verification of the gasholder, but it was a matter which should have serious consideration.

The deputation, having acknowledged their obligations for the courtesy with which they had been received, withdrew.

THE GAS QUESTION IN BRISTOL.

At a Meeting of the Council acting as a Local Board of Health for the City of Bristol, held on Saturday last,

The TOWN-CLERK (Mr. D. Burges, jun.) read the report of the committee of the Local Board of Health, which was as follows:—

The committee appointed, on the 9th day of November last, by the Town Council acting as the Local Board of Health of the city and county of Bristol, to regulate and manage all matters arising in respect of the application of "The Public Health Acts, 1848 and 1849," to the city and county of Bristol, and to take the necessary measures under "The Common Lodging Houses Acts, 1851 and 1853," and also a committee to receive notices, take proceedings, and in all respects execute "The Nuisances Removal Act for England, 1855;" the said committee, submitting their acts to the said Local Board of Health for approval, beg leave to report, That immediately after your meeting on the 18th of August last, the clerk of the board, by letter to the directors of the Bristol United Gaslight Company, informed them that at the said meeting you considered it not to be expedient to enter into a contract for lighting the public lamps in the city and county of Bristol for the term of 3 years on the terms of their tender of the 14th of June last, but that you were willing to contract for one year on the terms of such tender. In reply to this communication, your committee received a letter from the secretary of the gas company, in which he states that he was instructed to inform your committee that the directors do not feel themselves justified in entering into a contract with the Local Board of Health for lighting the public lamps with gas, for one year only, on the terms of the tender of the company of the 14th of June last, though, being anxious to meet the convenience of the Local Board as far as practicable, the directors would consent to continue the supply of gas to the public lamps upon the terms of the existing contract, for one year, from the 29th of September next. This reply having been submitted to, and considered by your committee, they deemed it advisable to ascertain what price the company would charge per 1000 feet, if the gas were burnt in the public lamps by meter; also, whether the company would agree to take the per centage of a certain number of lamps to be fitted with meters, and if so, what per centage as an average for deciding the consumption of the whole, or whether they would agree to have the amount of gas burnt determined by regulators applied to each burner, the Local Board of Health in both cases undertaking the lighting, extinguishing, cleaning, painting, and repairing of the lamps. Your committee accordingly instructed your clerk to write to the directors to that effect, which being done, a further letter was received from the secretary of the gas company, dated Aug. 30, in which he informed your committee that the directors were willing to supply the public lamps in the borough of Bristol with gas, in accordance with their Act of Parliament, at the lowest price charged to any private consumer, through meters to be attached to every lamp-service; the meters to be provided by the Board of Health, and approved of and fixed by the gas company at the expense of the Board of Health, by whom, should this system be adopted, the lighting, extinguishing, cleaning, painting and repairs of the lamp-fittings might be undertaken, and of course the Local Board would see the propriety, under this arrangement, of paying to the company the value of the 1300 service-pipes, fittings, and contingent apparatus in the ancient city and the district, now the property of the company. With respect to regulators for public lamps, the invention was of too recent a date, and the experience of their action too limited, to warrant the directors in entertaining for the present any proposal for their general use. Where, as in Bristol, the gas has a tendency to deposit naphthaline, the lights are frequently and unavoidably extinguished; and the directors were advised that the additional obstruction to the stream of gas to the burner caused by the intervention of a regulator would materially increase the probability of that inconvenience. This last letter of the secretary of the gas company not stating specifically the price to be charged per 1000 feet for gas to the public lamps, your clerk wrote to the secretary requesting to be informed what is the lowest price charged by the company at this present time to any private consumer, and received from him a reply stating such price to be 3s. 9d. per 1000 feet. Thus the matter now stands between the gas company and your board, and your committee now recommend that the gas company be requested to supply gas to the public lamps at the lowest price charged for the time being to any private consumer, calculating the quantity consumed according to the size of the burners, no meters being used, and substituting No. 4 for No. 5 burners. The gas company to light, extinguish, paint, and repair as at present, at present charges, unless they will agree to contract for one year on the terms of their tender of the 14th of June last.

Bristol, Sept. 6, 1860. WILLIAM HERAPATH, Chairman.

Mr. HERAPATH said that, as his name was attached to that report as chairman, he would make a few remarks. He reminded them that the question had to be settled before the 29th of September, and added, that as he had no business there, he would leave the room, but would just throw it out to them that the proper mode of managing the affair with the gas company would be to ascertain the real profits of the company, and they could not do that by merely examining the accounts deposited with the clerk of the peace, as the sums mentioned in them were so general that it would be impossible to ascertain the real profits of the company from them. If it were found that the profits of the gas company were greater than their legal profits could be, that was 10 per cent., and if they paid any excess above that amount towards establishing or extending their works, it would be seen that they took so much from the citizens beyond what they were entitled to charge for their goods. But if their gains were only 10 per cent., and they chose, after appropriating 9 per cent. to themselves, to put 1 per cent. towards the extension of their works, they were at liberty to do so. Having ascertained that they would be in a position to say to the gas company what sum they should pay for gas, but, at the same time that there was a reduction in price for gas for public lamps, there should be a reduction to private consumers; for any system that would reduce one branch of the company's income without lessening the other was unfair. With those general remarks he would leave the question in their hands. He would, however, refer to a paper which had been published that day, containing remarks of the committee of the Board of Health on the statement of the gas directors. These he understood to be—and, he believed, were wished to be understood to be—the remarks of Mr. Fry, and that the reso-

lution to publish them had been passed after the chairman and vice-chairman had left the room, and it was signed by the clerk at the request of the members of the committee who remained, so that, if any mistake was discovered in it, it must be taken as the mistake of the gentleman he had named in compiling the figures, and not of the committee at large. There was one mistake in particular in reference to the price of gas at present. It was stated that Bristol contained 137,000 inhabitants, that there were 20,873 houses, that 1000 feet of gas for public lamps cost 3s. 8½d., which ought to be 3s. 8d., and that the average price per 1000 feet to private consumers was 3s. 10½d.; the lowest price 3s. 9d. The price cited was an average struck by taking the highest and lowest prices, but that was not fair, for the number supplied at the lowest price was small indeed in comparison with those who were supplied at 4s. With those remarks he would leave the matter in their hands, for he had no right to be present at the discussion, though, if any questions were asked him, he should be happy to answer them.

Mr. VISGER wished to know whether the house had well and sufficiently considered the position in which members of the gas company were placed, for he did not consider that they were prohibited one iota beyond not having the power to vote in matters in which they had a personal interest, but held that, if it was carried further than that, it was a mistake, and would be productive of injurious consequences, for without the information they could give, the board would be acting comparatively in the dark. The committee had no doubt given their attention to the matter, and would probably put the house in possession of their view of the question. It did appear to him anomalous and dangerous that, because the members to whom he had alluded were prevented from voting in the decision of a question, they were constructively held not to be present during the discussion to give information, for in that case if any of the members had the misfortune to be connected with a company with reference to which the house had to come to a decision, that company would be undefended by those who, of all others, were best able to give the information desired.

The TOWN-CLERK said the law officers did not give any opinion on that matter at the last meeting; all they did was to read the Act of Parliament. Where the Local Board of Health business was transacted by the municipal body, all the provisions of the municipal body were ordered to be applied to that Local Board of Health. The first Municipal Act said that members were not to take part or vote in any question on which they were interested. The Act for further amending the Municipal Act was stronger, and would convince Mr. Visger at once, for it provided that it should not be lawful for any member of the council to vote or take part in the discussion of any matter before the council, in which he should, directly or indirectly, by himself or partner, have a pecuniary interest.

Mr. FRY said he did not believe that the house would hold that the business transacted by the committee, after the chairman had left, was objectionable. He was ready to admit that part he took in drawing up the paper referred to, and that Mr. Warren was instrumental in extracting the table for that document. With regard to the inaccuracy in the figures of which Mr. Herapath complained, he (Mr. Fry) would explain that, in page 8 of the statement of the gas company, they had set down 3s. 8d. as the price charged for lamps, but he had taken it at 3s. 8½d.; but the difference was not worth saying anything about. He had taken that course to follow the table published by the Metropolitan Gas Company, with a voluminous document, ordered by the House of Commons to be printed. They set down the price of gas to the public of Bristol at 3s. 8½d., and the same principle they applied to ascertain the price of gas in other towns applied to Bristol. He had not wished to do anything but what was perfectly fair. At page 9 of the statement of the gas company, they said they had made a reduction in the price of gas for public lamps, and for that reduction they took a credit of 5d. per 1000 feet, thereby, though not purposely, making an error of 2d., for one-sixteenth of 3s. 8d. was only 3d. Thus they had made a clerical error of 2d. With regard to the price of gas to private consumers, the paper gave too much credit to the gas company, for they charged generally 4s. per 1000, and a letter from their secretary two days ago stated that no more than five persons in the city of Bristol were supplied below 4s.; therefore, instead of the average being put at 3s. 10½d., it should be very nearly 4s.

Mr. TERRELL submitted that before such a paper had been issued, notice should have been given to the members that a proposal for such a course was about to be made. He did not believe that any of the members had any notice that such a course was to be adopted. He was present at the meeting of the committee till half past one o'clock, and he had no idea that such a thing was to be proposed, and did not believe that any person, excepting those particularly concerned in the matter, knew of it. There was a further irregularity he would mention. Some time back, when the Metropolitan Gas Bill was pending, petitions in favour of it were sent down from London to obtain the signatures of the different boards; such a petition was presented and read in committee, and it was asked that the clerk should sign it on behalf of the Local Board. It was agreed to at once, and would have been agreed to without the petition or the clauses of the bill being read. However, the petition was signed by the clerk of the committee, and sent up by the committee as the petition of the Local Board, but he contended that that was most irregular.

Mr. WILLS said he was present at the committee meeting, and before the chairman left there was a proposal made to read the paper. The proposal was made distinctly, and those gentlemen stated that they could not stay any longer.

Mr. HERAPATH: We were due at the finance committee.

Mr. WILLS: Another chairman was appointed, and they left.

Mr. JEFFERY said he was present at the committee meeting, but was not cognisant of the proposal. He understood that a legal opinion had been taken in the matter, but he had never seen it, and should like to know what that opinion was. Mr. Heaven, no doubt, knew, as well as some few gentlemen who had been appointed as a sub-committee, but he, as one of the council, would like to know what that opinion was.

Mr. Goss, in all his experience at the committee and the board, had never known such an important question as that of Mr. Fry's brought forward without a week's notice.

Mr. SHAW said the house had been sufficiently aware of the fact the Local Board of Health were anything but unanimous in the matter.

Mr. PERRY thought the way in which Mr. Herapath had represented the matter was most unfair. Mr. Fry rose several times, paper in hand, and said there was something he wanted to bring forward, but Mr. Herapath and Mr. Goss said they could not stop any longer. If those gentlemen did not choose to stop, but preferred going to another committee, they had no right to complain. He (Mr. Perry) said to Mr. Goss, "This is a most important matter," but he said, "I know best about that," or words to that effect, and they left. He (Mr. Perry) was quite certain Mr. Fry would have been glad to have presented the matter to the whole board. There was no difference of opinion after the gentlemen indicated left; the remainder of the committee were quite unanimous.

Mr. HERAPATH: We remained till ten minutes to two, and at two o'clock there was a finance committee meeting. We could not possibly be in two places at once.

After a word or two from Mr. C. J. THOMAS, the gas directors left.

Mr. Goss then rose to propose the adoption of the report of the Board of Health which had just been read. It would be in the recollection of the house, that in the last report it was recommended that they should take from the gas company a contract for one year on terms they submitted, and which offered a reduction of £600 per annum, the only difference between the committee and the company being that, whereas the latter wished that the contract should be taken for three years, the former only recommended that it should be taken for one year. Their object in recommending that it should be taken for one year was this: they were in hopes that all the unpleasantness should be put an end to, and it was not possible to do all that by the 29th of September. He thought that if the gas company were so perfectly correct as they stated they were—if it had turned out so, and experience had shown that they were right, they should have been much obliged to the Board of Health for bringing the matter before the public, and showing that they were correct. The tumult made on the matter outside must be known by everybody to be very great, and great dissatisfaction was felt about it; so that, if it could have been arranged satisfactorily, it would have been well. The committee came forward again, by the report which was read, to ask the company to give them the gas for one year, the consenting to which, he thought, would be a most dignified proceeding on their part; their cavilling about the little difference, and about the deduction, was not right. It would have been much more dignified if they had said, "Gentlemen, though we think we are right, we will supply the gas for one year, and you will see if we are not right." Then the committee would have come forward and said, "We are willing to take it on your own terms," at the reduced price, certainly not on the higher price. In the event of their refusing to do that, the committee recommended that the gas should be taken as provided for by the Act of Parliament, at 3s. 9d., but that the city should not be put to more expense; they further recommended that, where 5-feet burners were used, 4-feet burners should be substituted, and where 7-feet burners were used 5-feet ones should be substituted. The committee had arrived at that opinion, but he would not say that they were unanimous upon it; but they acted from the experience of their surveyor (Mr. Kitt), who had stated that the 4-feet burners, turned on full, gave an equivalent light, at all events, to what they had hitherto received. Mr. Kitt's experiments rested on their own merits. He was not going to stand there and say they were right or wrong; that had to be shown. It had been shown that his system of taking the experiments was correct, and if so, perhaps his experiments were also corrrect. The committee were of opinion that 4-feet burners were sufficient. He would just take the opportunity of saying a word about himself. A certain paper had referred to his exceeding dulness, which he was ready to admit. (A laugh.) But with regard to the accounts, he challenged the paper and the directors, on such a statement of accounts, to say that he was not correct. Why, look there. There was a charge of £13,600, and for wear and tear £7600, together £21,000, without any further explanation. He contended that that was not intelligible. They charged him with not sufficiently showing to the house the reason for objecting to meet the company in conference. The first thing he asked for was two letters—the committee's letter for a conference, and the company's letter in reply. They were not producible then. He wished that statement to be known, that the editor might be enlightened, if he could not enlighten him (Mr. Goss).

Mr. COLE would second the proposition, with a proviso that the company were given seven days to determine whether they would accept the terms. He was referring to the meters, when

Mr. Goss said he did not advocate the meters.

The TOWN-CLERK said Mr. Cole must move an amendment if he wished the proviso introduced, or he might second the proposition.

Mr. WEBB seconded the proposition, remarking that the gas company refused to light for one year on the reduced terms, but would contract for a year provided the board continued to pay the terms they were paying at present. The reduction was £600 a year in favour of the board. He trusted that after the statements that had been made, all unpleasantness would be put an end to, by the gas company acceding to the terms suggested by the committee.

Mr. COLE moved, as an amendment, that a proviso should be inserted in the report, giving the gas company seven days to consider whether they would enter into a contract to light the city for one year, on the terms they had proposed for three years. He added that he thought the gas company, if they looked to their own interest, would consent to do so. Three years ago, a committee of that house was appointed to consider the matter, and they reported that there should be a reduction of from 15 to 20 per cent. in the price of gas for the public lamps. The company refused to accede to such a reduction. The council were then in the position they were in at present. He considered that the directors were then on their trial for charging higher than they ought, and that a verdict of not guilty was agreed to, with the hope that they would not do it again. (Laughter.) He held that they were endeavouring to extract from the city more than was right and proper. The principle on which they acted was bad. Complaints were made when working men combined together for their own purposes, but here was a large company combining to keep up the high price of gas. He hoped something would be done for the advantage of the city. He concluded by moving that the following words be added to the committee's report—"Unless within seven days from this time, the directors of the gas company agree to supply gas to the public lamps for one year, at the rate they have named for three years."

The TOWN-CLERK: The proposition stands as follows:—"That the gas company do supply gas; not by meter, but by 4-feet burners, at the price charged to the lowest consumer."

Mr. COLE: I propose to add, "Unless they consent within seven days to accept the tender for one year, at the price they have offered for three years."

Mr. GOSS: They will not supply by meters, unless a meter is fixed to every lamp.

Mr. COLE: I referred to a contract.

The TOWN-CLERK: You wish added, "Unless the directors consent to supply for one year on the terms of the tender of the 14th of June."

Mr. COLE: That would give them an option of supplying the city at the reduced rate for one year.

Mr. VISGER said, if the proposition were adopted, they would not be moving a hair's breadth in the matter; on the contrary, it would leave them at a dead lock. He objected to the proposition as a member of the Town Council, as a citizen, and as a member of the community. He had serious

misgiving as to the propriety of reducing the 5-feet burners to 4-fect burners, for he thought the lights were not more than sufficient at present. He did not think, in a case of this kind, they were justified in trying so great an experiment as that of reducing 5-feet burners to 4-feet burners, and 7-feet burners to 5-feet burners. It had been said that the smaller burners would give more light in proportion than the larger ones, because, in the former case, the combustion would be less; but he had misgivings that they would not be justified in trying the experiment without more evidence than they at present possessed. In conclusion, he said he could not vote for the adoption of the report.

Mr. JEFFERY said that the inspector, with reference to all the lamps he examined, reported that no lamp was up to the point of 5 feet. They had either been half on, three parts on, or less than half on, but never any one on to the full, and that was why it was supposed the 4-feet burners would answer all the purposes if turned on at the full.

After a few words from Mr. Goss,

Mr. FRY said, he agreed with Mr. Visger that, if the proposition were adopted, the question would be left at a dead lock. The committee of the Local Board of Health had taken great pains in the matter, but he should not like to see the proposition adopted unless the board were unanimous, or nearly so. It was in the nature of an experiment, and they did not know what the result would be if the burners were reduced from 5 feet to 4 feet. He saw an experiment on one lamp, and it did appear to give a good light, but one lamp was no criterion for the result over the whole city. They must consider the proposition as an experiment, and he hoped no gentleman would press it unless it were to be carried pretty unanimously. In the event of the report not being agreed to, it remained only to take the original contract of the gas company for three years at the reduced price, or to take it for one year at the present rate; that appeared to be the position in which they were placed, unless they preferred further to fight them, and not take a contract at all. How far the council would choose to do the latter, was not for him to say. It seemed to him that they wanted more power over the gas company As he had stated before, the fair solution of the question appeared to him to be to obtain an Act by which they would be enabled to force an arbitration with the gas company, on the principle of an equitable comparison with other large towns, by a competent person, and such persons were to be found.

Mr. PERRY said he had taken considerable interest in the matter. With reference to the imputations as to the ability of the inspector, he (Mr. Perry) believed the whole of the board, save and except one, had the greatest confidence in his ability. In addition to that, the committee met him with one of the most eminent gas engineers in the kingdom. Mr. Kitt stated his test, and the gas engineer agreed that it was as good a test as could be used, and he (Mr. Perry) was satisfied with the inspector's report. He tried seven lamps, not one of which was burning 5 feet per hour; some were burning 3 feet, some 3¼ feet, and some 4 feet. That he (Mr. Perry) might not come before the council without knowing something about the matter, he undertook to request Mr. Kitt to put a lamp to burn exactly 4 feet per hour, that it might be seen what description of light it would produce. That was done, and the result was observed by Mr. Fry, Mr. Warren, and himself (Mr. Perry). They compared it with the adjoining lamp, which was burning 5 feet per hour, and there was a little difference, but very little. He was certain that the average of the lamps during the last winter was no better than the one burning 4 feet per hour, and he thought that no harm would accrue to the citizens from the adoption of the smaller burner. He thought they should change the 5-feet for 4-feet burners, or, rather, he hoped that the company would accept their offer for one year, as during that time all the little effervescence which had taken place would have subsided, both on their own part and that of the company, and all parties would have cooled down on the matter, and might come to an arrangement between themselves. He considered the report contained a distinct proposition, and he hoped the company would adopt it. The committee did not want to thwart them; no one on the committee wished to do so. He was sorry the chairman was not present to throw some light on the remarks he made, and which he (Mr. Perry) thought were anything but fair for a chairman.

Mr. SHAW said he would be the first to give the committee of the Local Board of Health credit for the efforts they had made for the public good, and for the great interest they had taken in this question. He would be one of the last to throw a damper on their exertions; but he must say he was quite of opinion with Mr. Visger. He (Mr. Shaw) trusted that the house would look the matter fully in the face, for it was a short period between the present time and the expiration of the agreement, and not allow that time to be frittered away. They had better look it boldly in the face, for they were at a dead lock. (No, no.) He apprehended it must be apparent to every one that this was only another proposition to be made to the gas company, and no doubt that company would turn around and say, "Yes, we are bound to supply you at the lowest price at which we supply to private consumers, but you must find gas-meters to tell what quantity you burn." Were they prepared to go to the expense of £4000 or £5000 for gas-meters? He had no interest in the gas company, and his desire would be that the matter should be settled by arbitration; but the committee had made an offer of arbitration to settle the matter without effect. He must confess candidly that the gas company had made out a strong case, which they had set before the public, but he could not say that it had quite got rid of the statement of the committee; but it was a powerful document, and the company had adduced many reasons to support their view of the question, which he was bound to assent to, and give them credit for. He would be glad, if possible, to effect a greater saving to the city; but they must not forget that, by accepting their tender for three years, they would be saving £600 per annum. Therefore, he thought it would be better for them not to be frittering away their time by making other offers, which were sure to be rejected. The gas company would not leave the position they had taken for one moment; and therefore he thought, with all respect to the committee and their report, they had better look the matter boldly in the face, and say whether, under all the circumstances of the case, they had not better fall in with the proposition of the company than lose further time. He threw out those remarks for the consideration of the house. At present he was not prepared to say how he should vote, or if he should vote at all, so difficult was the question; but he thought the time had arrived for a serious consideration of the question, and how the house ought really to deal with it practically.

Mr. WARREN said it must be a startling fact to anybody who investigated the amount paid by the city for gaslighting to find that it was £3000 more than Manchester paid, a city of double the population, and possessing property of double the rateable value, and that it did not fall far short of the amount paid by Liverpool, which was three times its extent. The committee felt that they would be wanting in duty to the city if they allowed that state of things to continue without any attempt to remedy it, and to put the city on a proper footing. It was a question whether the gas company should dictate terms to the corporation of Bristol. They characterized the demand of the board, to be placed on an equal footing with other places of the same kind, as unreasonable, and they insinuated that it would be improper to endeavour to victimize private consumers to obtain a reduction for the public lights. The table published by the committee was not in their own figures, but it was extracted from the minutes of evidence published by the House of Commons, and it would show, without a possibility of successful contradiction, that gas cost more, not only for the public lamps, but for the private consumer, than for any other city of equal size in the United Kingdom. Mr. Fry had pointed out a clerical error in the statement of the gas company. They first of all admitted that the price of gas for public lamps should be charged lower than to private consumers, but they went on to argue, on that clerical error, that they had made a reduction of 20 per cent., but the reduction was only, in point of fact, 11 per cent., according to their own figures. If they calculated 3s. 5d. for public lamps, and for private consumers 3s. 10½d., they would see that the reduction was only 11 per cent., but a much larger reduction than that to the public lamps should be made; for, in the first place, ratepayers were compulsorily taxed for public lights, although they did not always burn gas as private consumers. The public lights paid for full estimated quantity, whereas there were meters for private burners, and they got credit for any reduction of the pressure. For the public lamps there was no danger of superuflous burners or meters registering against the company, and the company saved public lighting, complicated book-keeping, inspection, loss from bad debts, and interest of money from extra credit. Public lamps must invariably be lighted with gas, whereas private consumers, if they felt aggrieved, could resort to oil, paraffin, camphine, or candles. That was impossible for public lamps. Then there was another consideration—that was, the goodwill of their very profitable business, which he conceived they contributed much to, by conferring a monopoly of the gaslighting, and, in return for the immense profit they made out of it, they owed a duty towards the corporation, and their careful aim should be to light the city at a reasonable rate. Still they found, on an average of 70 towns, that the public lights were charged 25 per cent. less than private consumers, and in about 90 towns in America they charged, in many cases, one-half the price they charged to private consumers. He contended that the public lamps were charged much too high at present, and even would be by the contract that was offered. The question they had before them at present was one with reference to the public lamps. The private consumers would have an opportunity, when the investigation took place before the quarter session, of urging their claims. He thought that, if the committee were not supported in the cause it had taken—the endeavour to obtain a fair and equitable price for the public lamps—they could not expect any member of that committee to take any trouble with regard to any public business again. There were various errors in the statement put forth by the gas company which he thought ought not to have occurred; for instance, with regard to the comparison of Bristol and Bath, it was stated that the average distance between the lamps of Bristol was 70 yards, or that there were 25 per mile. That was not the case. He had the authority of the surveyor of the Board of Health for saying that, taking in every mile of road in Bristol, alleys, courts, and every footpath under the jurisdiction of the board, comprehending every part of the borough, and roads not lighted, such as the roads over the Down and under St. Vincent's rocks, and others, the whole of the roads in Bristol amounted to 100 miles, and the number of lamps they had was nearly 3300, consequently that made the average of distance between the lamps 53 5/10ths, and not 70 yards, and gave as the number of lamps to every mile 32¾, and not 25. They founded a serious argument on that statement which he thought it proper to explain. They stated that Bristol only paid £100 per mile for lighting, but their bill came to £11,700 per year, and, taking the distance at 100 miles, would give £117 per mile, and not £100. He must say that the pamphlet had been got up by the gas company with little care as to accuracy. As regarded the correctness of the experiments of the inspector, they were singularly borne out by experiments during a lengthened period in nine parishes in London, and various other towns in the provinces, all showed the results quite analogous—that the public lamps did not actually consume more than three-fourths of the gas they were expected to consume. They found by the register of pressure, that the pressure was only kept up till 12 o'clock at night, and diminished greatly in the morning before the lamps were extinguished; and therefore by burning 4 feet an hour, they considered that they would be in the same position they had been hitherto. That this would bring matters to a dead lock, he could not understand. The gas company were bound by Act of Parliament to light the public lamps on the lowest terms they charged to private consumers. He would mention incidentally an extra charge they had obtained, through some slip on the part of the board, on the public lamps in Bristol. They were bound to bring their service-pipes at their own expense by their Act from the mains to the public lamps, but they had inserted a clause in the contract by which the board paid that expense, averaging £1 per lamp. Another thing had crept into practice long before he joined the board. He alluded to the contract for the repair of lamps and adding of new lamps, which the board had to pay for under the contract, and which showed that the company obtained every advantage from the city that they could. They were bound to charge the city the lowest price charged to any private consumer. The board was a pretty large consumer, paying £11,000 year; yet for all that they charged them about as much per 1000 feet as as they charged the smallest consumer. If that was liberality on the part of the gas company, he did not know what to expect from them. He did trust the House would unanimously support the committee in endeavouring to obtain fair terms from the gas company. The board was not so powerless as some imagined; they had power to take up pipes, syphons, plugs, or cocks, that the gas company had laid down, and to charge them with the expense. He did not say it would be right to do such things, but, if the company endeavoured stringently to enforce their monopoly against the board, the latter might use the legal powers the law allowed them to defend themselves.

Mr. SHAW would move an amendment. He knew several gentlemen—himself among the number—who were bound to leave, and if one left the meeting, there would be no house; therefore he would suggest the desirability of taking the vote at once. He proposed, under all the circumstances of the case, that it was prudent and desirable to continue for one year at the present rate, or to take the gas company's offer for three years, subject to the consideration and approval of the committee.

Mr. COLE said, after the lucid explanation of the committee, he thought one and all should support the committee.

Mr. WETHERMAN seconded the amendment.

Mr. LANG submitted that the fact that other gentlemen had engagements elsewhere was no reason why the discussion should be put an end to.

The MAYOR said he agreed that, as a general rule, it was advisable to

support the recommendation of the committee, but he would ask one question on the present occasion. Suppose they adopted the proposition, could they compel the gas company to assent to it? If not, they would be putting themselves in an undignified position. If they could compel the gas company to accept it, he should certainly support it; but if they were at the mercy of the gas company, and they could turn round and say, "We will not accept it," the board would be placing themselves in an undignified position by adopting it.

On the occasion being put to the town-clerk, he said it was an exceedingly difficult one to answer, but in order to answer it he would read to them again the recommendation of the committee. The committee recommended that the gas company be requested to supply gas to the public lamps at their lowest price for the time being to any private consumer, calculating the quantity consumed according to the size of the burner, no meter being used. As at present advised, he did not believe they could compel the gas company to assent to the recommendation.

Mr. PERRY: The Act says nothing about meters for public lamps.

The TOWN-CLERK: But they must measure gas.

Mr. PERRY: They measure it now.

Mr. POWELL: If they measure it now with the 5-feet burners, they can surely do so with the 4-feet burners.

The TOWN-CLERK said it was a question of law. Suppose the gas company thought that they were not compelled to supply except by meter, how did the board propose to compel them to do so? By legal means! and then the company would fight them, and there would be exactly the same difficulty.

Mr. COLE asked if they were not in possession of legal advice on the matter?

The TOWN-CLERK read the clause in the Act of Parliament, which provided that, from and after the expiration of any contract, the company should, on the request of the Local Board, afford the requisite supply of gas on the same terms as they charged to any private consumer for the time being. He added that he believed, in the construction of that clause, the court would ask, how did the company supply private consumers? the answer would be, by means of meters; and the court would hold that the board were compelled to afford the gas company the same means of measuring the gas as the gas company compelled private consumers to provide. If the board chose to go in the character of private consumers, he believed they would be compelled to stand in the situation of private consumers.

Mr PERRY said they found that the company supplied meters themselves, and charged the consumers a reasonable price for the loan of them. The board could also rent the meters.

The TOWN-CLERK said that a much greater man than the law officers of that body (Mr. Karslake) had given an opinion on the point to the following effect—"I do not think the company will be bound to provide meters if the board shall desire to be bound by them."

Mr. HEAVEN (clerk to the Local Board) said that at a recent meeting of the board a resolution was come to, to the effect that a certain application should be made to the Court of Quarter Session, that certain proceedings should be taken against the gas company, and that an application should be made to Parliament to incorporate the 120th clause of the Town Improvements Act with the Local Act, to give the board power of arbitration. He conceived that the matter was of such grave consideration, and that the duty of advising the council how to act in the matter, rested in a great measure on his responsibility, and without considerable care they might be led into litigation which might entail heavy expense without beneficial result to the council. He thought he was quite justified in going to counsel for advice and opinion to guide him in giving advice to the council on the subject. He did endeavour to get the advice of a gentleman in London, but not being able to meet with him, and hearing that Mr. Karslake was in Bristol, whither he had come to attend the assize, and knowing that his opinion was one that would carry great weight in legal matters, he went to him, laid the case before him, and asked him certain questions. Knowing that cases laid before counsel were generally somewhat restricted, he had a conference with Mr. Karslake on the subject, going thoroughly into the matter with him, meeting any observation he might make, and giving him an opportunity of putting any questions he might think fit. He got Mr. Karslake's opinion on the necessary points, and he thought it was but justice to himself that he should read it to the council.

Mr. HEAVEN, in answer to Mr. Warren, explained that he had no instruction to get the opinion, but he took it, thinking it a duty to himself to do so. He was about to read the opinion, when

Mr. AYRE objected to his doing so, submitting that the gas company should not have the benefit of it. (Laughter.)

Mr. VISGER thought the opinion should be read.

Mr. PERRY asked if Mr. Heaven had called Mr. Karslake's attention to the clause of the Act cited by the town-clerk?

Mr. HEAVEN replied that he obtained Mr. Karslake's special opinion upon it.

Mr. WARREN said if it was any one's duty to carry out the resolution of the last meeting, it was the town-clerk's.

The TOWN-CLERK begged Mr Warren's pardon, but it was not so. He (the town-clerk) was not the legal officer of the Local Board of Health. It would be in the recollection of the council that unfortunately he was put up in opposition for the clerkship to his friend, Mr. Heaven, but the council decided by a majority that Mr. Heaven should be clerk to the Local Board of Health. Therefore he (the town-clerk) did not think that, having carried the election of Mr. Heaven by a majority, the responsibility of acting should be put on himself (the town-clerk) or Mr. Brice. They merely attended, as it was a great pleasure for them to attend, to assist their friend, Mr. Heaven, and in deference to the mayor and members of the corporation. He (the town-clerk) was not, however, the legal officer of the Local Board of Health.

After a word or two from Mr. COLE,

Mr. WARREN said, with a general approval of Mr. Heaven's conduct, he did not consider that that officer had acted right in this instance, in drawing a case for the opinion of counsel without the consent of the board. He did not think that Mr. Heaven had paid proper deference to the Local Board of Health.

Mr. VISGER and Mr. COLE held that Mr. Heaven had acted prudently.

Mr. POWELL begged to differ from them. It was usual when a public body wished counsel's opinion to order a case to be drawn, and afterwards to consider the case, to see whether it included all the points, and then to determine to whom the case should be submitted. It was certainly due to the board that this should have been done in the present instance.

The TOWN-CLERK said that, if he had been instructed by any of the public bodies which he had the honour to attend to take proceedings against any party, he should not hesitate, or ask anybody's sanction at all, but should go to counsel and advise with him as to the best course to pursue.

Mr. POWELL: What, draw a case without submitting it to the board?

The TOWN-CLERK said that the responsibility would rest with himself in that case: he had nothing to do with the present matter, but he wished to do Mr. Heaven justice; a resolution was passed at the last meeting that he should take certain steps at the quarter session, to enforce an arbitration in the matter. He spoke to him (the town-clerk), and to Mr. Brice on the matter, and they agreed that it was an exceedingly nice point, and that they would not go to the quarter session unless well advised to do so. Mr. Heaven consequenly took the advice of counsel.

Mr. SHAW said he felt that the discussion that had just taken place must have been painful to Mr. Heaven, and he (Mr. Shaw) had been pained on Mr. Heaven's behalf. Was it to be tolerated that an excellent officer—a much underpaid officer—should be spending money out of his own pocket, the qetter to qualify himself to transact the business of the board, and then to be found fault with? He (Mr. Shaw) had never heard so outrageous——

Mr. VISGER: That's not so; you are under a misapprehension.

Mr. SHAW said he understood that Mr. Heaven had been getting an opinion to enable him the better to conduct the business of the board. Whether the board was to pay for it or not, was a secondary consideration. If his clerk put himself in a position to do his business better than he otherwise would be able to do, he (Mr. Shaw) would applaud him for it.

Mr. AYRE said there was a misapprehension altogether about this matter, for he recollected Mr. Heaven stating that he must be advised with reference to it; and certainly Mr. Karslake's name was mentioned. Whether Mr. Heaven did it before the committee broke up, or to him (Mr. Ayre) afterwards, he could not say, but he was quite sure he thought it would be judicious.

Mr. COLE was quite satisfied he heard it.

Mr. HEAVEN said, under ordinary circumstances, most probably he should have come to the committee on the subject, but this was a matter that was pressing. There was to be a meeting of the committee on the Thursday to take the matter into consideration, and he felt the importance of being able to advise the committee. He endeavoured by telegraph to London to get a conference with a gentleman there, but was not able to do so, and took the next best course open to him by taking the opinion of Mr. Karslake. He made an engagement with Mr. Karslake to meet him on the Thursday after the meeting, and he mentioned his intention of doing so, and that he had prepared a case. Many members would recollect that he was obliged to leave the meeting to meet Mr. Karslake on the matter.

Mr. COLE said that Mr. Heaven's statement was correct.

A division then took place. On Mr. Shaw's amendment being put, six members voted for it, and seventeen against it.

The amendment was consequently lost, and the original proposition by Mr. Cole was carried without a division.

The meeting then separated.

NEW SERIES OF ORGANIC COMPOUNDS.

QUADRICARBURET OF HYDROGEN AND ITS DERIVATIVES.

By M. BERTHELOT.

[From the *Comptes Rendus.*]

The two most simple hydrocarburetted gases are marsh gas or carburetted hydrogen, $C^2\,H^4$; and olefiant gas or bicarburetted hydrogen, $C^4\,H^4$. Each of these carburets has become the type of a series of compounds represented by the same general formulæ; the carburet $C^{2n}\,H^{2n+2}$ corresponds to the marsh gas, the carburets $C^{2n}\,H^{2n}$ to olefiant gas. Each of these numerous carburets produces, by its metamorphoses, alcohol, aldehyde, acids, combinations of chlorides, bromides, &c.; in a word, a complete series of derivatives, of which the number increases daily, in consequence of new discoveries. I now present to the Academy the result of my researches upon a third carburetted hydrogen, a gas like the two preceding, represented by a similar simple formula, and which appears destined to become equally the type of a general series not less numerous and important. This is acetylène, or a quadricarburet of hydrogen, represented by the formulæ $C^4\,H^2$, the prototype of the carburets—$C^{2n}\,H^{2n-2}$.

Acetylène is produced whenever olefiant gas, the vapour of alcohol, of ether, of aldehyde, and even of wood spirit, is caused to pass through a tube heated to redness. It is also generated when metallic copper of the same temperature is acted upon by the vapour of chloroform. Lastly, it forms part of the ordinary lighting gas. Ether furnishes it in the largest quantity.

Under whatever circumstances it may be produced, acetylène is mixed with a large proportion of other gases, and it must therefore be disengaged, in the first instance, in a particular combination of which the subsequent decomposition produces it in a state of purity.

This combination is identical with a red and detonating composition discovered by M. Quet in subjecting the gases obtained in the decomposition of alcohol by the electric spark, or by heat, to an ammoniacal solution of proto-chloride of copper. The same substance has been also examined by M. Böttger, but neither of these *savans* has analyzed the gas disengaged when it is dissolved in hydro-chloric acid. This gas is acetylène, of which the following are the properties:—

Acetylène is a gas without colour, soluble in water to a considerable extent, possessing a disagreeable and characteristic odour; it burns with a very brilliant and smoky flame. Mixed with chlorine, it almost immediately detonates with a deposition of carbon, even under the influence of diffused light. I have not succeeded in liquifying it either by cold or by pressure. Its specific gravity is 0·92. One volume of acetylène exploded in the eudiometer forms two volumes of carbonic acid, and absorbs two volumes and a half of oxygen. These results, in conjunction with the density, determine the formula of acetylène as $C^4\,H^2$. This formula represents four volumes. It presents several remarkable peculiarities. We see first that acetylène is the least hydrogenated of all the gaseous carburets of hydrogen, a circumstance which accounts for its great stability. Its centesimal composition is the same as benzine, $C^{12}\,H^6$; of styrol, $C^{16}\,H^8$; but these two substances are liquid, and their vapour is more condensed. Finally, acetylène $C^4\,H^2$ only differs from aldehyde $C^4\,H^4\,O^2$, and from glycol $C^4\,H^6\,O^4$, from its containing the elements of water. Nevertheless, I have not succeeded in obtaining it from these two substances, by operating at a low temperature.

Let us now consider the chemical properties of acetylène. They may be condensed by saying that this gas possesses for the most part the essential properties of olefiant gas, from which it differs only by the two equivalents of hydrogen. It furnishes parallel derivatives in uniting itself to bromine, to sulphuric acid, to the elements of water, and to hydrogen. It will be easy to generalize the future combinations founded upon these first results, by examining, step by step, each of the derivatives of olefiant gas. I do not dwell here upon the bromide of acetylène, $C^4\,H^2\,Br^2$. I shall also return at a future period to the analysis of the compounds formed by acetylène and the proto-chloride of copper with the azotates of silver and of mercury, as well as to the analysis of the similar compounds that I have dis-

covered between olefiant gas and the salts of silver and of mercury. The existence, the mode in which they are formed, and the properties of these compounds, appear to me to throw a new and unexpected light upon the constitution of fulminating bodies.

Acetyl-sulphuric acid merits special attention. This acid is prepared by means of acetylène exactly as ethyl-sulphuric acid is prepared by means of olefiant gas. In both cases, the absorption of the gas is effected solely by means of concentrated acid, and by the assistance of violent and continued agitation prolonged for a considerable time. To absorb a *litre* of acetylène by sulphuric acid, more time is required than for olefiant gas. A *litre* of acetylène requires at least an hour and four thousand agitations for its absorption. The absorption being terminated, the acid is diluted with water with great care, and saturated with carbonate of baryta. Upon evaporation, a well-crystallized salt, of the acetyl sulphate of baryta is obtained.

Instead of saturating it with the carbonate of baryta, it may be distilled. By a systematic rectification, a peculiar liquid is obtained, slightly more volatile than water, very changeable, giving an odour analagous to acetone, but extremely irritating. It is soluble in ten or fifteen parts of water; and it may be precipitated from its aqueous solution by the carbonate of potash; but it appears not to be precipitable by the chloride of calcium.

I look upon this liquid as acetylitic alcohol $C^4 H^4 O^2$, which differs from ordinary alcohol $C^4 H^6 O^2$ by two equivalents of hydrogen. I limit myself to pointing out here the existence of these compounds; the difficulties which present themselves in preparing considerable quantities of acetylène have prevented me hitherto from studying them in detail, but I purpose returning to the subject.

I will conclude by establishing a new relation between acetylène and olefiant gas, founded upon their respective transformations. I have before mentioned how olefiant gas and its hydrates (alcohol, ether) furnish acetylène, but these approaches to similarity repose upon phenomena of complicated destruction and operations at high temperature. I have succeeded in producing the inverse metamorphosis at a low temperature—that is, the changing of acetylène to olefiant gas:

$$\underbrace{C^4 H^2} + H^2 = \underbrace{C^4 H^4}$$

Acetylène. Olefiant gas.

All that is required is to treat with nascent hydrogen the combinations which result from the action of acetylène upon ammoniacal proto-chloride of copper. I made several ineffectual attempts before obtaining the results sought for. Nascent hydrogen, developed in an acid liquid, did not give suitable results; but it was quite otherwise with the nascent hydrogen produced by the reaction of zinc upon ammonia in presence of acetyl coppery compounds. Under these circumstances, a gas very rich in olefiant gas is disengaged, which remains mixed with hydrogen and a little acetylène. The olefiant gas is isolated, and purified by a particular process which I have discovered, but which it would take too long to describe. The olefiant gas obtained in a state of perfect purity may afterwards be submitted to an eudiometric analysis.

Two points are to be here remarked: first, the method employed to develop nascent hydrogen in an alkaline liquor, and in presence of organic compounds, and this method seems to me to be susceptible of very extended applications: secondly, the defined relation between acetylène and olefiant gas—a relation which serves to fix the place of the first carburet of hydrogen in the systematic classification of organic compounds. It is the point of departure in the acetylic series parallel to those of the derivatives of ordinary alcohol.

The acetylic series is, above all, interesting from the simplicity of its composition, and its systematic construction entirely based upon synthesis. In fact, it derives acetylène regularly from its fundamental carburet of hydrogen, and this carburet itself may be obtained either from olefiant gas and its derivatives, or from wood-spirit and chloroform; that is, from the derivatives of marsh gas. Now, I have established that marsh gas and olefiant gas may be formed by the combination of the simple bodies which constitute them. The same demonstration applies then to acetylène, and all the series of combinations that this carburet forms in its turn by the synthetic process.

A TRIP TO THE COAL-OIL REGION OF PENNSYLVANIA.

[From the *United States Railroad and Mining Register*.]

Mr. Editor,—Allow me to give the readers of your valuable *Register* an account of some things that were seen and learned during a recent visit to the famous oil region of north-western Pennsylvania.

Starting from Warren, we descend the right bank of the Allegheny River about twenty miles from Tideout, and here first encounter the "derricks"—a frame structure composed of four upright timbers, eight or ten feet square at base, slightly inclined towards the top, enclosed at intervals by horizontal frames, the whole forming a truncated pyramid twenty to thirty feet high, and used for the purpose of guiding and raising the rods to which the "drill" is attached.

Their elevation and peculiar appearance make them conspicuous, and the number in view as we drive along the river bank give evidence that we are now amongst "*the oil*." In a distance of about two miles, dotting both sides of the river, there are here over thirty "borings," and others commencing almost daily. At the time of our visit, five of them were in oil sufficient for working—of which one had their pumps in operation then three days, and the others were preparing to fit up.

The "surface indications" here consist of percolation of oil through the gravel that lines the river shores, small springs in the river-bed, and on Gordon's run and other ravines in the neighbouring hills. At some points along the shore, the sand and clay saturated with oil has a dark brown colour; and the gravel compactly cemented forms a hard concreted mass, all emitting the peculiar odour that distinguishes petroleum and coal oil.

In one case, in attempting to reach the rock by shaft through the gravel of the river bank, preparatory to boring, the water that came in brought with it oil equal to about a quart per bucketful. Except, however, as an "indication" the surface oil is not relied on; it is only found in paying quantities in the under-laying rocks, where it is reached by boring.

The "*wells*" here vary in depth from 120 to about 300 feet. Oil in sufficient quantity for pumping is generally found at from 150 to 200 feet—but two or three wells have gone beyond the latter depth without finding it; but, as much the largest number have not yet reached it, no one can say what the grand result at Tideout will be. A few weeks more will show whether the majority will be a success or a failure.

Owing to the imperfect arrangements for gauging the only well yet in operation, it was impossible to ascertain its yield with accuracy; but it is safe to put it at seven barrels of oil per day: the pump showing 3 per cent. of oil and 97 per cent. water—the latter very salt. The pump, however, did not exhaust the well, and if the defective machinery that we noticed throughout the region, as well as at this point, were replaced by better, there is no doubt but the product of the wells would, in many cases, be largely increased.

From Tideout, the river that flows almost due south for about fifteen miles, and then slightly south of west to Franklin, is said to exhibit more or less of the "indications" for the entire distance, and has many "borings" in progress along it; but, as we did not visit them, we have no personal knowledge of their success.

Leaving the river, and crossing a country that has no reason to boast of either corn, wine, or oil, we reach Titusville, fifteen miles distant, in the south-east corner of Crawford County. Within two or three miles of Titusville, the "derricks" again make their appearance—and here we are, on Oil Creek, in the heart of the region. Here we talk oil—smell oil—live, move, and have our being in oil. "Indications"—"strikes"—"leases"—"smells"—"blossoms"—"yields"—are discussed on every side, and the only measure of quantity is the "barrel." A well and its owner are both estimated by the "barrel"—just as a Southern planter is valued by his "bales."

About a mile south-east of Titusville are the forks of Oil Creek—each branch of which is some fifty feet wide. Between them for about half a mile from their confluence, the flats are low, in many places swampy, and covered with a heavy growth of beach, maple, elm, and oak timber. Here are visible the traces of ancient "diggings," apparantly pits for the collection of the surface oil; they have been sunk through the loam to the gravel beneath. Some of them are yet three or four feet deep, and although seen at a very dry season, had water standing in them covered with a film of oil.

From the mounds at their sides, in many instances, trees of great age are growing, giving proof that many—probably hundreds of years ago—this locality was the scene of busy "operations in oil."

On this ground is a well 118 feet deep, from which is pumped daily from 18 to 21 barrels of oil. Within 175 feet of it another well was sunk, in boring which at a depth of 143 feet a stream of oil was struck, which rose to the surface, and for about two weeks flowed 12 barrels of oil per day. It then nearly ceased, and the drill was resorted to for the purpose of sinking deeper. In about two feet, a crevice in the rock was pierced and the oil gushed out, filling the pipe (5 inches diameter) and spouting three or four feet above it. Buckets and barrels were brought into active use; but despite all exertions, it is estimated that 20—some said 30—barrels of oil were lost. The rapid flow of oil was soon checked by driving a plug into the top of the pipe, permitting the escape only of what could find vent through the openings in a joint about three feet from the top, and through the crevices around the plug.

This vein of oil was opened about six p.m. on the 24th of July. We visited the well next day, and were among the crowd of admiring spectators who witnessed its wonderful performances, and commented thereon with theories more marvellous than the fountain before us. The flow from the well was intermittent, after a few moments rest—apparently to recover breath—a violent rush of gas and oil would occur, hissing through the cracks of the joint, and spouting in jets from around the plug six or eight feet high. It would partially subside, then gush with renewed vigour, and thus boiling for several minutes, would seem to exhaust itself, and take a breathing spell preparatory to another desperate attempt at escape.

Around the mouth of the well was a pit that would contain ten or twelve barrels, and from it two men were steadily dipping the oil with buckets, and filling the barrels that covered the ground around them.

Inserted in this pit, and extending to the bottom, was the stock of a small hand pump, by means of which a boy would pump out the water. The proportion of water did not appear to be one-eighth the quantity of oil. About four p.m. its breathing stopped. A period was put to its flow, as well as to some bright hopes that had gushed responsive in the breasts of anxious operators. One hundred and fifty-three barrels were filled with oil during the twenty-two hours run: which, together with what was lost at the start, made a yield in that time of fully 170 barrels.

After resting nearly two days, it again started, flowing with diminished force for a short time, and, from information since received, I learnt that it yet repeats the eruptions—in one case yielding 30 barrels in two hours. During all this eccentric performance its more sedate neighbour continued to furnish its regular flow.

On the same flats there are several other borings in progress, of various depths, from 100 to 200 feet, none of them have anything but the surface oil.

Above Titusville many wells are in progress; examinations have been made to the sources of Oil Creek, but the result does not appear to have been very favourable. Not having visited that part of the region, we are unable to speak of it with certainty. It does not have the reputation of the portion below.

Down Oil Creek working wells are numerous, and those in progress much more so. The ones in operation are of various depths, from 70 to 300 feet, and they yield from 5 to 20 barrels of oil per day. The valley of the stream is studded with them through its whole extent to the Allegheny River (about 15 miles from Titusville), but the ground is not all equally profitable—in some places there are *barren* tracts—but in many localities they are generally successful. As we approach the river, similar remains of old works are visible as at the forks, and one well gauged in that vicinity furnished 20 barrels of oil. This well is 118 feet deep, and yields about 6 per cent. of oil to 94 per cent. of water.

On the Allegheny River, both above and below the mouth of Oil Creek, wells are numerous and said to be generally successful, especially in the vicinity of Franklin—7 miles below—but we did not visit them for want of time.

The process of obtaining oil may be generally described as follows: where an alluvial deposit of any considerable depth covers the rocks, cast-iron pipes 5 inches inside diameter and one inch thick, in sections of ten feet, are driven with an ordinary pile-driver, and the enclosed material removed by use of drill and sand pump—the sections of pipe are turned smooth 3 or 4 inches from each end, and when the top of one section is driven nearly to the surface, a wrought-iron band, 6 inches wide, is shrunk on, the lower end of another section inserted, and a continuous tube thus formed extending to the rock. The length of the piping varies from 20 to 100 feet. The greatest depth in wells visited by us was 98 feet.

When the rock is thus reached, or when it approaches the surface so that no pipe is required, it is bored by a heavy cast-steel drill, with a bit 4 inches wide, 1 inch thick, and the edge very obtuse. The rod to which the drill is attached is usually in sections of about 12 feet in length, the lower one generally of iron, and the remainder wood.

They are connected by screw and socket, and generally worked by hand, with the aid of a spring-pole—two, frequently three, men at a drill; though sometimes a steam-engine is used. At the top of the derrick, before described, is a pulley, used for raising or lowering the drill. In some cases,

instead of a rod the entire depth of the well, but two or three sections are used, attached to a rope for the remainder of the distance; but this plan is not generally preferred. A sand-pump, or sheet-iron tube about four feet long, with a valve in the bottom, is used to extract the material from the well; and it may be well imagined that each successive pumping is anxiously watched for "indications." A "smell" is quite an event, and the appearance of oil on the water brought up by the pump is hailed with delight.

The region is now well supplied with drillers and their tools; and wells are usually sunk by contract.

The cost for derrick is from 20 dols. to 30 dols. Cast-iron pipe delivered about 2 dols. 50 cents per foot lineal. Drilling, 2 dols. per foot for the first 100 feet, and 25 cents per foot added for each additional 25 feet. The same rate is paid for driving and boring out the pipes as for drilling rock. The cost of a well 200 feet, with 40 feet piped, would therefore be about 563 dols.

When sufficient oil to justify working has been obtained in the well, a pump is inserted, formed of gas-pipe or copper tube, as may be desired—the latter is necessary when the water is salt. They are about two inches inside diameter. There is much want of economy in availing of the small space at command, the valves in many cases being but five-eighths of an inch diameter, thus reducing the capacity of the pump below that required to clear the well of water. It then becomes necessary to shut off the water that enters the upper part of the well, and of course all the oil that accompanies it. This is done by means of a "seed-bag"—a leather sack 18 or 20 inches long, surrounding the pump-stock and filled with flax-seed. When wet, this swells and effectually closes the aperture around the pump, which then only operates on what enters at the bottom of the well. In some cases, owing to the small capacity of the pump, it is necessary to place the seed-bag very near the bottom.

The pumps are worked by portable steam-engines of from 3 to 5-horse power. All those we noticed were made in Buffalo, and a more miserable set of machines could not easily be turned out of any shop than most of those in the oil region are.

No better field is now open for the introduction of the small engines so well made in Philadelphia, and he will be a public benefactor who accomplishes it.

The water and oil pumped from the well passes into a tank holding from 400 to 800 barrels. It is kept well filled, to allow the oil and water to separate. The latter is allowed to escape through a faucet near the bottom; the oil is drawn off by one at the top, put in barrels, and is ready for market.

All the works around the wells are of a temporary character. The derrick is boared up and forms the pump-house. One frame shanty covers the engine, and another the tank; and, as this is also a lumber region, the cost of the building is slight.

The entire expense of a well, with machinery and buildings ready for operation, is 1200 dols. to 1500 dols., depending of course chiefly on the depth. The latter may be assumed as the cost of a 200-foot well. A working force of three men will operate one night and day.

Most of the oil goes to New York; it is hauled about twenty miles (sixteen from Titusville) over very bad roads to the nearest station on the Sunbury and Erie Railroad. Some of it descends the Allegheny River by keel-boats during low water, and by steamers when the navigation permits, to Pittsburg.

No reliable account is known of the quantity produced up to this time, but it may, I think, be safely assumed at 8000 barrels.

The daily yield cannot now be less than 500 barrels, and is rapidly increasing by the opening of new works. It sells at the well at from 18 to 20 cents per gallon, according to cost of transportation.

A few wells are owned by the proprietors of the soil, but most of them by lessees of the "oil privilege," who pay a royalty of from one-fourth under the old leases to five-eigths under recent ones, in favourite localities—many of them are sub-let two or three times, so that an operator's profits are not in all cases as large as they look. The working expenses do not exceed one half barrel of oil per day, with a ten-barrel well; even after paying a rent of five-eighths, an operator can make a very handsome thing of it. In fact, it is hard to imagine any business where an investment of 1500 dollars will do better.

What is the source? and will the supply continue? are questions easier asked than answered.

Experience seems to indicate a diminution of the flow at many of the wells now worked, especially in those that yielded largely at first—several that were 30, 50, and some over one hundred barrels daily at the start, are now down to a regular yield of 20 barrels and under. It would, therefore, seem probable that an accumulation of oil furnishes the abundant supply to newly opened wells, greater than the subterranean streams can maintain.

The laboratories that furnished the stock now on hand are doubtless yet in operation, but what their capacity is for a regular business cannot yet be told.

It may be they are affected by the seasons. All the early wells of large yield that are now diminished, were opened during last winter and spring, when the ground was wet and springs flush. Many of the latter are now dry, or running with greatly diminished flow; and, inasmuch as the oil accompanies the water, it is reasonable to infer that the quantity brought out is temporarily reduced by this cause.

The source of these subterranean oil streams is also a matter of doubt. They are attributed by many to the great Appalachian Coal Basin, whose north-western rim they border; and are supposed to have their origin in the coal that caps the highlands, extending from McKean to the south-west. Was this so, it should be found escaping from the hills with the outcrop of the coal strata, and cut off by the deep ravines of the intervening watercourses; in addition to which, their flow would be against the dip of the entire geological formation—thus refuting the belief that water will not flow up hill.

It is much more probable they result from the carboniferous slates and shales of the Cadent and Vergent series of Professor Rogers, many of which are highly bituminous. These have their outcrops to the north and north-west, and it is among the vergent shales and their interlaying sandstones that the oil is found. Their dip is to the south-east, with a general trend to the south, and the flow of a liquid generated among them would naturally follow their direction.

It is a remarkable fact, that in the entire report on the State Geological Survey, but a single incidental allusion (vol. 1, p. 583) is made to what is now rapidly becoming an item of great importance; and this does not lessen the necessity of a thorough examination by a competent person. The ground is too extensive to be disposed of by a mere visitor, and it would be much easier to undertake a reliable description of the Schuylkill Coal Basin, with all the thousand local details of mines, works, and productions, than to obtain complete geological and statistical information of this opening oil region. Is there not sufficient enterprise among the useful and scientific associations of Philadelphia to undertake it? It is understood that an application has been, or is to be, made, to the Smithsonian Institute for that purpose: but surely Philadelphians will not wait until all the credit, as well as profit, resulting from opening a new source of State wealth is appropriated by others, before they wake to a consciousness of its importance? By all means, let one competent to the undertaking be sent out to collect all reliable data; he can add something to our scientific knowledge, do much for the development of a new, but fruitful, field of industry, and if he escape the oil fever, will be more fortunate than most of those who have visited the land of

Smethport, Pennsylvania., Aug. 4, 1860. PETROLEUM.

CARDIFF GASLIGHT AND COKE COMPANY.—The forty-seventh half-yearly meeting of the company was held in the board-room of the company's offices, last week, Evan David, Esq., in the chair. The directors, in their report, referred to the great loss the company had sustained by the death of their late estimable chairman, Charles Crofts Williams, Esq. The shareholders, also, passed a resolution expressing their deep sympathy with the family of the deceased gentleman at the bereavement they have experienced. A dividend at the rate of 10 per cent. on the old shares, and 8 per cent. on the new shares, was declared payable on the 29th September next. The thanks of the meeting were voted to Mr. Bowen, the engineer, for his management of the company's business, and also to the chairman for presiding.

Price Current.

CASTINGS, PER TON.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 5 0	2 12 6	2 12 6	3 0 0	3 5 0
1½ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 ,, ,,	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 ,, ,,	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards ,,	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
,, 2nd ,, cold ,,	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ¼ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
,, ,, ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
,, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Cups, Plugs, and	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets [Nipples	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, PER TON.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 3d.	Boghead, at Leith	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	6 6	Kirkness, best	23 0
Pelaw	6 9	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 0	,, 2nd ,,	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	,, ,, Leith	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 9
		Pirnie	15 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester	6s. 6d. to 6s. 9d.	Boulogne and Calais	£8 0 0
Cork	10 0	Barcelona	24 0 0
Dover	8 0	Bordeaux	17 0 0
Dublin	10 6	Cadiz	16 0 0
Exeter Quay	9 6	Copenhagen	9 0 0
Folkestone	8 0	Dieppe	—
London (Pool)	6s. 6d. to 7 0	Genoa	22 0 0
Lowestoft & Yarmouth	4s. 9d. to 5 0	Hamburg	8 10 0
Lynn	—	Havre	£10. 2s. 6d. to 10 5 0
Portsmouth	7 9	Leghorn	22 0 0
Plymouth	9 0	Lisbon	17 0 0
Ramsgate & Margate	8 0	Rotterdam	8 0 0
Whitstable	6 6	Stettin	9 10 0
Weymouth	8 6	Trieste & Venice	£25 to 26 0 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	30s. 0d.	
Cliff's Fire-bricks, at Wortley	per 1000	35 6	
Ingham's Fire-bricks, at Wortley	,,	35 0	
Fire-clay Retorts	per foot run,	5s. 6d. to 7 0	
Tough Cake Copper	per ton £100 0s.	Foreign Spelter	per ton £20 0 0
English Pig Lead	,, 21 5	English Block Tin	,, 136 0 0
Welch Bar Iron, in London	,, 6 10	Banca	,, 136 0 0
Tarred Rope Yarn	per cwt.	26s. 0d.	

TO GAS-FITTERS AND OTHERS.

THE Vestry of St. Luke, Chelsea, being desirous of securing the best Design that can be obtained for LIGHTING their new Hall and Board Room, are willing to receive suggestions, accompanied by Tenders, for the same, together with the general Lighting of the Premises, for which Plans and Specifications have been prepared by, and can be seen at the Office of the Architect, W. W. Pocock, Esq., 35, Craven Street, Charing Cross; it being understood that the parties tendering are to be at liberty to suggest and adopt any other mode of Lighting the Large Hall and Board Room that they may deem expedient.

Tenders to be delivered on or before Wednesday, the 12th instant at the Office of the Architect.

The Vestry do not bind themselves to accept the lowest or any Tender.

By order,
CHARLES LAHEE, Vestry Clerk.
Offices of the Vestry, 111, King's Road,
September, 1860.

CONDENSER for Sale at the Gloucester Gaslight Company's Works, consisting of a Box 16 ft. 6 in. long, by 8 ft. 6 in. wide, with Divisions, 40 Vertical Pipes, 9 ft. 6 in. long, and 7 in. diameter, connected together at the top by half-circle bends, capable of condensing 6000 cubic feet of gas per hour. The total weight, including the screw-bolts and nuts, is upwards of six tons.

For further particulars apply to the Manager, Mr. MC PHERSON, at the Works.

Sept. 7, 1860.

CRYSTAL PALACE DISTRICT GAS COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of the SHAREHOLDERS of this Company will be held at the Albion, 153, Aldersgate Street, in the City of London, on TUESDAY, the 25th day of September, inst., to receive the report of the Directors and Auditors, to declare a Dividend, and for general business. The Chair will be taken at Three o'clock precisely.

By order of the Board,
MAGNUS OHEEN,
Secretary and Manager,
Offices, Bell Green, Sydenham, S.E.

TO GAS COMPANIES.

STOKERS' GLOVES,
11s. per Dozen.
S. CARPENTER, 3, BOW COMMON.

METROPOLITAN BOARD OF WORKS.
MAIN DRAINAGE OF METROPOLIS.
NORTHERN OUTFALL SEWER.

TO Builders, Contractors, and others. The Metropolitan Board of Works hereby give notice, that they will MEET in the Council Chamber, Guildhall, in the City of London, on Friday, the 5th day of October, 1860, at Twelve o'clock at noon, precisely, and will then be prepared to open TENDERS by parties who may be willing to CONTRACT for the FORMATION of an EMBANKMENT, and the CONSTRUCTION of MAIN BRICK SEWERS therein, 5 miles 1400 feet in length, or thereabouts, together with Iron Bridges, and other works in connexion therewith. The works will commence at a point west of the River Lea, at Old Ford, cross the Stratford Road, pass through West Ham, Plaistow, and East Ham, and terminate at Barking Creek, in the respective counties of Middlesex, Essex, and Kent.

Parties desirous of submitting Tenders may, upon payment of £5, obtain Plans, Sections, and Specification, Form of Tender, and other particulars, on application to Mr. J. W. BAZALGETTE, Engineer of the Board, at the Office of the Board, on and after Tuesday, the 28th of August inst., between the hours of Nine a.m., and Four p.m.

Tenders addressed to the Metropolitan Board of Works, must be delivered at the Office of the Board, No. 1, Greek Street, SOHO, before Four o'clock p.m. on Thursday, the 4th day of October, 1860, and no Tender will be received after that hour.

The Board do not bind themselves to accept the lowest or any Tender, and the party whose Tender shall be accepted will be required to provide two approved sureties for the due performance of the works.

JOHN POLLARD, Clerk of the Board.
No. 1, Greek Street, Soho, Aug. 22, 1860.

AMMONIACAL LIQUOR FOR SALE.

THE Directors of the Worcester Gas COMPANY are desirous of receiving TENDERS for the AMMONIACAL LIQUOR produced at their Works for a term of Three or Five years.

Applications to be made to Mr. OASTLER, the Company's Manager.

THOMAS W. ALLSOPP, Gas Engineer and Contractor, Castle Donington, near Derby, Manufacturer of every description of Gas Apparatus, Gasholders, Boilers, &c.

TO CONTRACTORS.

SHEERNESS Sewerage and Water-WORKS.—TENDERS are required by the Local Board of Health for the District of the Parish of Minster, in the County of Kent, for the under-mentioned Works, viz.:—For sinking and steaning a Well; building Engine Houses, Water Tower, Manager and Workmen's Houses, Board Room, Baths, Tanks, Sewerage Filter, Steam Engines, Pumps, Scoop Wheel; making Sewerage and Water Pipes, with all necessary Hydrants, Stop-cocks, Ventilators, Gullies, and other works requisite for the thorough sewering the District of Sheerness and supplying the same with water, according to plans furnished by Mr. William Burns, C.E.

Persons desirous to tender for the execution of the said works will be supplied with copies of the specifications, quantities, &c., on payment of 10s. 6d., and may see the plans at the Office of the Local Board, 58, High Street, Mile Town, Sheerness, on and after Monday, the 27th of August, 1860. The office hours are from ten a.m. to four p.m.

No Tender will be entertained, unless it be made on the printed form annexed to the specifications, nor unless it be full and complete in every particular.

Tenders, endorsed "Tender for Sewerage and Water-Works," and addressed to the Clerk, must be delivered at the Office of the Local Board of Health, Sheerness, on or before Thursday, the 13th day of September, 1860, and before four o'clock p.m. on that day.

The Local Board do not bind themselves to accept the lowest or any Tender.

By order of the said Local Board of Health,
EDWARD FELKIN, Clerk.
Sheerness, Aug. 1, 1860.

LESMAHAGO GAS COAL.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coalfields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas Coal, that they are prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

Shipping Agent for Glasgow:
MR. ALEXANDER STRATTON,
159, WEST GEORGE STREET.

GAS PURIFYING BY REVIVIFIABLE OXIDE OF MANGANESE.

MR. LAMING (Inventor of the Revivified Oxide of Iron Purification) begs to inform Gas Engineers that they may now supersede the material in general use by A REVIVIFIABLE OXIDE OF MANGANESE of his preparing, which in efficacy is at least equal, and in economy superior, to Oxide of Iron. Owing to the greater chemical activity of Manganese, common dry-lime purifiers of ordinary capacity will often be amply sufficient for it, though they may be too small for the Oxide of Iron material.

For Gas-Works possessing steam power, more especially such as are exposed to public complaint, Mr. Laming recommends the purification to be done either wholly or in part (depending on extent of apparatus) in out-of-doors scrubbers, hermetically sealed, by means of his liquid process, which is both economical, and meets all practical requirements.

118, Fenchurch Street, Aug. 1, 1859.

LEONI'S Patent Adamas Gas-BURNERS (secured by Her Majesty's Royal Letters Patent), are entirely free from liability to CORROSION, injury from Heat, or danger of Fracture, and are UNALTERABLE in the dimensions of their Apertures.

Uniformity in the consumption of Gas is obtained by the process of manufacture, which ensures that the Burners shall be of precisely similar pattern.

The Adamas Burners are confidently recommended to Gas-Fitters, Consumers, and Companies.

Sole Manufacturer and Patentee in Great Britain, S. LEONI, Adamas Works, St. Paul Street, New North Road, LONDON, N.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW, Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

BELGIAN CLAY RETORTS.

ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications, addressed to ALBERT KELLER, GHENT, will receive immediate attention.

WANTED, in a small Gas-Work in a Village, a Man thoroughly competent to undertake the Management and to Manufacture the Gas, doing the whole of the work himself. Two retorts only are in daily use. He must be strictly honest, sober, and industrious. There is a newly erected cottage on the Works, which, with nearly half an acre of garden ground, firing, and light, would be found him.

Address, stating age, if married, and wages required, to J. J. T., Office of this JOURNAL.

TO GAS COMPANIES.

THE Advertiser, who has at present the entire Management of a Gas-Work in a Provincial Town where he has been for the last six years, is desirous of a similar Engagement, where the annual make of Gas is from 8,000,000 to 12,000,000 feet. He was bred a Practical Engineer, and has a thorough knowledge of every detail in connexion with the Manufacture and Distribution of Gas on the most approved principles, and is competent to carry out all extension and improvement of Works, the laying of Mains and Services, &c. Has a practical knowledge of interior Gas-Fitting, the registration, repairing, and testing of Meters. Can keep accounts, and collect Gas Rental, and give first-class evidence of successful management of the Works he is now engaged in, and the highest Testimonials for character and competency.

Address W. C. J., care of Mr. KING, 11, Bolt Court, Fleet Street, LONDON, E.C.

SOUTH METROPOLITAN GAS-LIGHT AND COKE COMPANY.

NOTICE is hereby given that an ORDINARY MEETING of the PROPRIETORS of this Company will be held at the London Tavern, in the City of London, on WEDNESDAY, the 10th of October next, at Two o'clock precisely, to receive the Directors' Report and the Accounts of the Company for the Half year ended June 30 last, and to declare a dividend for the same period.

By order of the Directors,
THOMAS LIVESEY, Secretary.
Old Kent Road, Sept. 10, 1860.

COUNTY and General Gas Consumers COMPANY (LIMITED).—Works at Chertsey, Lea Bridge, Northfleet, Pembroke, Pembroke Dock, Ware, and Walton-on-Thames, producing a gas rental of about £6500 per annum.

Established for the erection of gas-works in provincial towns, or the purchase or leasing of existing works on equitable terms. Application to be made to the Engineer to the Company, Mr. H. P. STEPHENSON, 58, PALL MALL.

M. SHEEN, Gas and Railway Lantern Maker, 90½, Holborn Hill, begs to inform Managers of Gas-Works, &c., that she continues to contract and supply Lanterns on reasonable terms, and keep them in repair by the year.

TO STOKERS AND FITTERS.

WANTED, for constant employment in a Country Gas-Work, where the make of gas is about 29,000,000 per year, two experienced Workmen (one STOKER, one FITTER). They must be active and sober men, thoroughly understand their duties, and be able to read and write.

Reference to last employers will be required.

Address to A. Z., "The Cooperage," Red Mead Lane, Wapping, LONDON.

COUNTY and General Gas Consumers COMPANY (LIMITED).

NOTICE is hereby given, that the DIVIDEND on the paid-up Capital of this Company for the half year ending 30th June last, at the rate of 6 per cent. per annum on the Preference Shares, and 5 per cent. per annum on the Ordinary Shares, will be PAYABLE on and after the 1st day of October next, between the hours of 12 and 2 daily, at the offices of the Company, 76, King William Street, E.C.

By Order,
R. S. PARKER, Secretary.
London, Sept. 8, 1860.

TRUSS'S PATENT ELASTIC PIPE-JOINT,
FOR GAS AND WATER-MAINS, AND STEAM PIPING,

Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

Drawings, Estimates, and every particular, furnished on application to

THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

HENLLIS WORKS,
NEWPORT, MON.,
ESTABLISHED 1842.

CYRUS HANSON,

Manufacturer of CLAY RETORTS, and every description of Fire Bricks. Retort Mouth-Pieces, and Wrought-Iron Work.

Agent at BRISTOL, Mr. GEORGE FRY, WELCH BACK.

GRAY, BAILEY, and BARTLEET,
BERKLEY STREET, BIRMINGHAM.
Manufacturers of Chandeliers and Gas Fittings, and Patent Steam Gauges.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,
MANUFACTURERS OF EVERY DESCRIPTION OF
FIRE BRICKS, CLAY RETORTS, LUMPS, TILES,
&c. &c.
LONDON OFFICES:
76, KING WILLIAM STREET, CITY.
A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS,
WEDNESBURY,
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

TO Mr. BENJAMIN WHITEHOUSE,
GASHOLDER MAKER,
WESTBROMWICH, NEAR BIRMINGHAM.
Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.
During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.
RICHARD JONES.
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

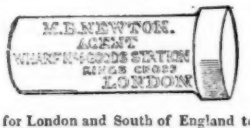
SAMUEL CUTLER, Gasholder
MAKER and CONTRACTOR
For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.
PROVIDENCE IRON WORKS,
MILL WALL, POPLAR. LONDON, E.
Main Laying and Gas-Works erected complete.

JAMES NEWTON,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANT,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON.
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and CLAY,
and every Article suitable for
GAS AND WATER WORKS.

EIGHTON MOOR GAS COALS.—Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

GEORGE BOWER,
GAS ENGINEER, MANUFACTURER,
AND CONTRACTOR,
ST. NEOT'S, HUNTS.
References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

J. CLIFF'S Fire Bricks, Clay
RETORTS, &c.



Orders for London and South of England to be addressed to Mr. NEWTON, Agent for the District, 16, Castle Terrace, New Hampstead Road, KENTISH TOWN, N.W.
N.B.—A few Retorts of each size, and a large stock of Bricks and Lumps, always on hand at the above Wharf.

CANNEL and COAL of the best descriptions for making GAS and COKE.
(As per Analyses.)
GAS CANNEL, 17s., 15s. 6d., and 14s. per ton.
GAS COAL, 11s. 6d., 9s. 6d., and 8s. 6d. per ton.
STEAM COAL, 10s., 9s. 6d., and 9s. per ton.
All free on board Vessels in Liverpool.
Handpicked Cannel and Coal about 10 per cent. additional. Concession in prices made for large quantities.
GAS APPARATUS of all descriptions, and on the most approved principles; also Purifying and other materials supplied.
ANALYSES, PLANS, and ESTIMATES, and other information required, and the highest references furnished on application.
CONTRACTS for Materials and Works entered into.
No charge made for Superintending Shipments, Preparing Bills of Lading, or passing Entries.
EMANUEL TURNER and CO.,
EXPORT OFFICES:
34, CASTLE STREET, LIVERPOOL.

Gas Stoves, Gas Baths, Gas Cooking APPARATUS, warranted the best in England, at PHILLIPS'S, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.
PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

FIRE-CLAY RETORTS.
JOHN SWARBRICK,
MANUFACTURER OF PATENT COMPOSITION CLAY RETORTS,
FIRE BRICKS OF EVERY DESCRIPTION, SHAPE, AND SIZE, &c. &c.
HIGHER EANAM, BLACKBURN, LANCASHIRE.
These RETORTS are generally used in the Gas-works of Preston, Accrington, Bury, Heywood, Middleton, Rochdale, Ratcliffe; the Mills of Messrs. Horrocks, Miller, and Co., Preston, &c. &c., and are unequalled in having afforded general satisfaction to those who have given these Retorts a trial.
To meet the increasing demand, the Works at Little Harwood have been greatly enlarged; and Gas Engineers who may favour with an Order may rely with confidence on their being promptly supplied with an article not to be surpassed in finish or durability.
PRICES MODERATE.

EDWARD COCKEY AND SONS'
PATENT GAS VALVES.
These Valves are formed of two Cast-Iron Cylinders, with segmental divisions, having the faces ground gas-tight—the upper Cylinder turning horizontally on the lower one.
The lower Cylinder has pipes from each division, communicating with the vessels to and from which the gas is to be passed. The upper Cylinder has corresponding divisions, so arranged as to direct the passage of gas to the different segmental divisions in the lower part, and when it is turned on the face of the lower one, to alter the flow of gas from one vessel to another.
Many of these Valves are now in use on Gas-Works; and, amongst others, the following may be mentioned:—
CHELTENHAM GAS-WORKS.—A Valve for 2 Purifiers, with 9-inch Connexions.
NEWPORT, MONMOUTHSHIRE.—Valves for 3 Purifiers, with 12-inch Connexions.
BASINGSTOKE.—A Valve for 3 Purifiers, with 6-inch Connexions.
WARMINSTER.—A Valve for 2 Purifiers, with 6-inch Connexions, and Bye-pass Valve for Meter.
GODALMING.—A Valve for 3 Purifiers, with 5-inch Connexions.
RYDE, ISLE OF WIGHT.—A Bye-pass Valve for Exhauster, with 9-inch Connexions.
The Engineers of either of these Works have kindly allowed reference to be made to them.
IRON WORKS, FROME SELWOOD.

EDWARD COCKEY AND SONS
ALSO MANUFACTURE
PURIFIERS, SCRUBBERS, CONDENSERS, AND OTHER IMPROVED GAS APPARATUS,
HAVING PATTERNS SUITABLE FOR GAS-WORKS OF DIFFERENT SIZES.

TO GAS COMPANIES AND CONTRACTORS.

FOR Sale, several lengths of Hydraulic MAIN, 14 inches diameter and 6 feet 9 inches long, with 7 holes for DIP-PIPES.

Also 4-inch ASCENSION-PIPES, and 3-inch ARCH and DIP-PIPES, and RETORT MOUTHPIECES, all in excellent condition, and will be sold at a very low price, and delivered, if required, at any Railway Station in London.

To be seen, on application to the ENGINEER, at the Equitable Gas Company's Works, Lupus Street, PIMLICO.

BENJAMIN GIBBONS, Jun.,
DEEPDALE FIRE-CLAY & BRICK WORKS,
Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,
TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

JOSEPH WILLCOCK
(late BARLOW and CO.),

Mechanical and Architectural Draftsman, Designer, Serveyor, an Lithographer to Gas Engineers and Gas Apparatus Manufacturers, formerly Superintending Engineer at the largest Gas Apparatus Manufactory on the Continent.

Patent and Designs Office, 89, Chancery Lane, LONDON, W.C.

GEORGE ANDERSON, Gas and
CONSULTING ENGINEER,
104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,
supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,
one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,
designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

EDWIN DIXON,

WOLVERHAMPTON PATENT WROUGHT-IRON TUBE WORKS,
Originally established in 1833,
Manufacturer of Gas and other Tubes, Fittings, and articles of every description belonging to Gas, Water, or Steam.

E. D. had the honour of receiving the

PRIZE MEDAL

awarded to this Manufacture by the COUNCIL of the GREAT ENGLISH EXHIBITION of 1851; and from he latter date has supplied many towns exclusively with GALVANIZED and other Tubes for Gas and Water, under GOVERNMENT ENGINEERS.

A City, containing 150,000 inhabitants,

has recently been entirely supplied with Tubes made at the above-named Works, and several others with populations nearly as great; in fact, the reputation now acquired induces this notice to the public.

Large Stocks generally on hand, averaging from one to three hundred thousand feet.

HYDRAULIC PRESS TUBES,
to resist 6000 lbs. and upwards to the square inch, extensively manufactured.

STOCK DIES and SCREWING TACKLE
of the best possible descripton.

Every Tube carefully tested with Hydraulic Pressure before leaving the Works.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King.
Originally J. Pidcock, Esq.

NB. A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches, 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

WEST and GREGSON, Gas-Meter
MANUFACTURERS, &c.
UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

WALTER FORD,

LATE

PADDON and FORD,
GAS-METER AND APPARATUS WORKS,
GRAY'S INN ROAD, LONDON.
MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,
AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WILLIAM SUGG,

MANUFACTURER OF
PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,
"EVANS'S" PHOTOMETERS,
Experimental Meters, Minute Clocks, &c., Station Meters and Governors,
STREET-LAMP GOVERNORS AND LAVA BURNERS,
19 and 20, MARSHAM STREET, WESTMINSTER.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,
7, SNOW HILL, AND 16, WEST STREET, LONDON.
ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,
EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,
AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GASHOLDERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c. &c., similar to those used by Mr. King, of Liverpool.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

WILLIAM PARKINSON AND CO.,

(SUCCESSORS TO THE LATE SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

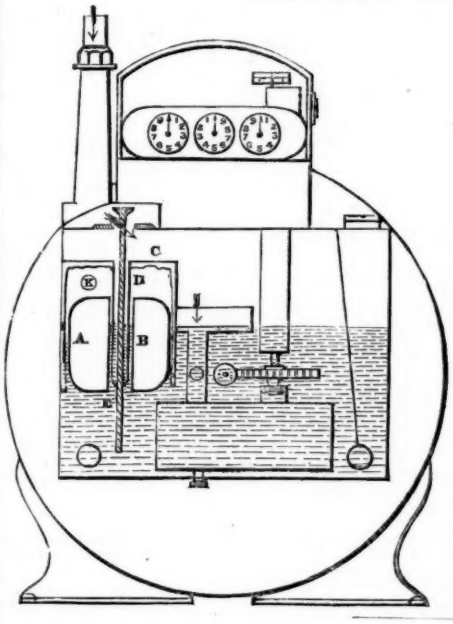
PATENTEES AND MANUFACTURERS OF

STATION-METERS & GOVERNORS,

CONSUMERS' METERS & GOVERNORS,

AND OTHER GAS APPARATUS. ALSO,

METERS FOR MEASURING WATER.



IMPROVED LOW-SPOUTED GAS-METER,

WITH

NEW PATENT FLOAT ARRANGEMENT.

The Float A is partitioned off from the front frame considerably below the water-line, and is pierced perpendicularly by a tube B.

A large gas-way, C, is left between the top of the partition and the valve-seat. The small tube D, in which the float-wire works, is fixed to the top of the partition, and comes down below the water-line inside the tube B. The float-wire is soldered to the float at E, so as to allow water to pass into the tube D, in order to seal it. The chamber above the float is open to the outlet through the hole K.

The action of this float is exactly opposite to that of ordinary meters. The float is elevated by sudden pressure, and the valve cannot be closed except through want of water.

W. P. and Co. beg especially to call the attention of Gas Companies and others to this New Patent Meter, which entirely overcomes the difficulty experienced by ordinary wet meters, owing to the short range of the float, which is necessary in order to meet the requirements of the "Sale of Gas Act."

They are prepared to supply

TEST GASHOLDERS,

of the most approved description, graduated by the Standard.

BOULTON'S PATENT DRY GAS-METERS,

Of which upwards of 24,000 are at present in use, having gained for themselves an unparalleled patronage from all the principal Gas Companies and Consumers, on account of their unerring registration and the superior workmanship and materials used in their construction, enables the Patentee to sell them now at competitive prices with those of other makers.

Every description of Improved Wet or Patent Dry Meters and Gas Apparatus manufactured by

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL.

All Meters warranted to comply with the requirements of Lord Redesdale's "Sale of Gas Act."

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

PERRENS & HARRISON,

STOURBRIDGE FIRE-CLAY AND BRICK WORKS,

THE LYE, STOURBRIDGE,

Beg to inform Gas Companies and Consumers of Fire-Bricks that, having largely increased their facilities for manufacturing their improved

GAS-RETORTS,

CLIFT'S PATENT GAS-OVENS,

and FIRE-BRICKS of all descriptions, they are now prepared to supply goods to any extent, the quality of which will, they are confident, secure them further orders.

From the peculiar nature of the material employed, Retorts and Fire-Bricks made by Perrens and Harrison are less liable to contraction when put to work than others, the important advantages of which cannot be questioned.

Perrens and Harrison purchased in 1850 the whole of the Trade and the

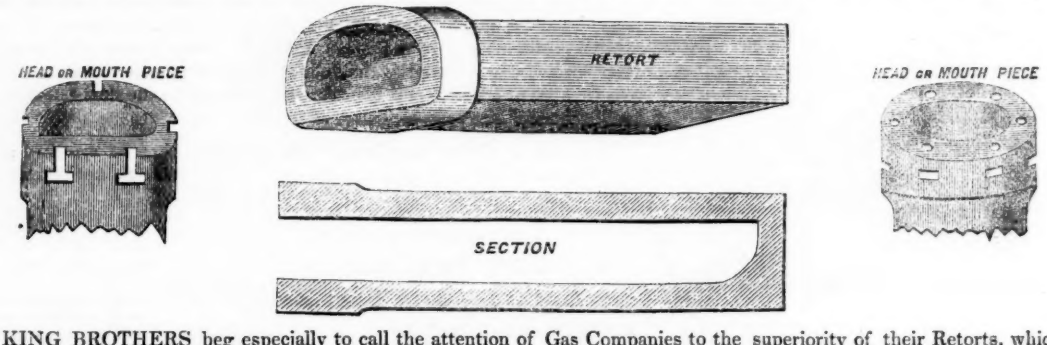
SOLE RIGHT OF WORKING

the well-known Mines belonging to the late firm of **J. & W. KING,** and as several mistakes have occurred which have been as annoying to their customers as themselves, they beg to request that all letters may be addressed as above.

Any number of References can be given on application.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS,



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

FREE FROM CRACKS AND CORRECT IN FORM.

By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABBITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M. B. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER and CO.

(Contractors to Government).

24 WHARF, HARROW ROAD, PADDINGTON, W.

Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.

CRUCIBLE and CEMENT CLAYS.

GARDEN EDGINGS, of various patterns.

BUFF and ORNAMENTAL TILES.

CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.

Shipments on the shortest notice.

WROUGHT-IRON Guides for Gas-HOLDERS, when Trussed upon scientific principles, are more capable of resisting strains, in every direction, than Cast Columns of any form can be; and weigh only one-fifth as much as the latter. Designs and Working Drawings for Guides and Ties can be obtained of the Inventor, CHARLES DIXON, C.E., Chichester, SUSSEX.

NOW READY,

VOL. VIII. of the JOURNAL of GAS LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1859, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., V., VI., and VII. are still on sale.

W. B. KING, 11, Bolt Court, Fleet Street.

GAS COAL.

BEAL, WALKER, and CO., Coal and COKE MERCHANTS, No. 1, Walker's Buildings, SHEFFIELD, beg to inform the Directors and Managers of Gas Companies, that they are in a position to contract for the supply of the different sorts of best Gas Coal, such as best Silkstone, Barnsley, and others, at the lowest prices, which may be had on application at the above Office.

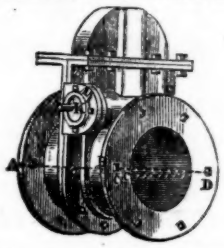
ALFRED PENNY, Engineer

WENLOCK IRON WORKS,

WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY begs to inform Gas and Water Companies that he undertakes the erection of new, or the alteration of existing, works; and that he may be consulted generally on all matters connected with gas and water supply. He is also prepared to supply best Cold-blast Retorts, Socket-Pipes, and Connections, Iron Borings, &c. &c., and all the necessary Castings used in Gas and Water-Works.

*** Country orders executed with care and despatch.



BRYAN DONKIN & CO.

keep always on stock their

IMPROVED GAS VALVES

from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

These Valves are all proved to 30 lbs. on the square inch before leaving the works.

BRYAN DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

JOHN ROGERSON and CO.,

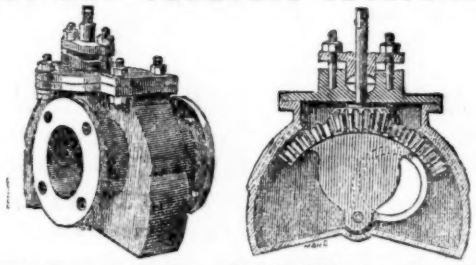
NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:

12, ROYAL EXCHANGE BUILDINGS.

BEST AND CHEAPEST SLUICE-COCK.



BROWN AND MAY'S PATENT.

Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

NORTH WILTS FOUNDRY, DEVIZES.

Wholesale Agents, Messrs. S. and E. RANSOME, 31, Essex Street, Strand, E.C.,

Where a Sample may be seen.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

London Agents: CHADWICK and AKEROYD, Willington Stone Wharf, Regent's Park Basin.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

SALE OF GAS ACT.

MESSRS. CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Also Manufacture and Supply

TEST GAS-HOLDERS,

And other Apparatus required by the Inspectors appointed in pursuance of the above Act.

Application for particulars to be made to the Factory,

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES RUSSELL AND SONS,

CROWN TUBE WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE:

81, UPPER GROUND STREET, BLACKFRIARS,

LONDON, S.

THE ORIGINAL INVENTORS, AND FIRST MANUFACTURERS OF THE

Patent Wrought-Iron Tubes for Gas, Steam, Water, &c., &c.; Enamelled Tubing, and Glazed ditto.

Russell and Howell's Homogeneous Tubes; and Agents for G. F. Muntz's Solid Brass Tubes.

EVERY VARIETY OF FITTINGS.

TRADE MARK.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the office of Joseph Clayton, 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court Fleet Street, in the City of London.—Tuesday, September 11, 1860.